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Many are the books that treat on gardening, and "My Garden Companion" adds one more to the list.

It has been well said that every writer who interprets the secrets, and brings amateur cultivators nearer the understanding of the mysteries of gardening, is a contributor to the wealth and happiness of life.

The chapters comprising the pages of "My Garden Companion," have appeared, for the most part, in the columns of **The Daily Telegraph** during the past twelve months, and it is by kind permission of the Proprietors that I am able to reproduce them in this handy form.

Gardening instruction is always of greater value when illustrated, and my endeavour to picture the text is largely gained through personal observation, and portrayed in a manner likely to be approved generally.

To complete the series a second volume must be issued next season, and the Publishers will be pleased to register addresses of readers desirous of receiving particulars when ready.

DONALD McDONALD.

Fellow of the Linnean Society.

CLEEVE HOUSE,
BEXLEY HEATH, KENT.
March 1st, 1902.



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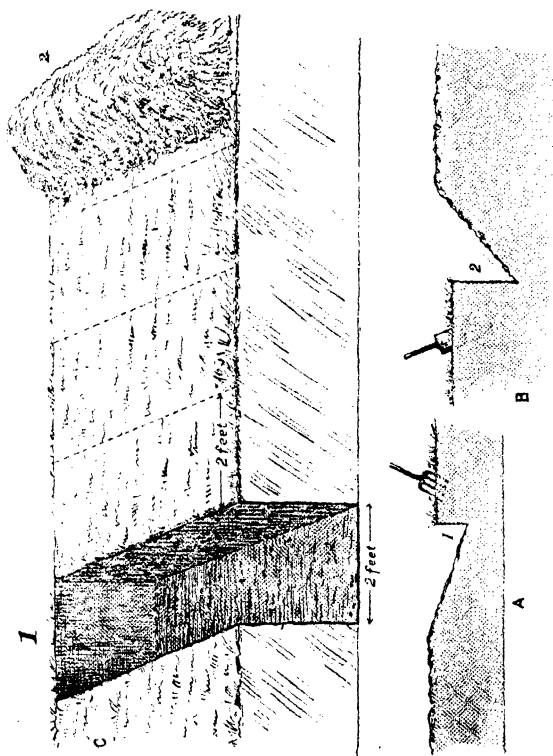
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A Picture-Lesson on Digging Ground.

- A.—Pointing ground. 1.—This may be any depth from 2 to 6 inches.
 B.—Digging ground. 2.—The trench should not be less than 1 foot deep
 C.—To illustrate trenching ground. 1.—Earth taken out according to scale. 2.—End of piece to be
 trenched where soil is taken to, for turning into the last opening. See page 5.

ON DIGGING AND TRENCHING.

It has been the constant lament of the amateur gardener during the last three or four years that his crops have become burnt up during summer. Peas that ought to have given two or three pickings have gone off after the first gathering, lettuce and spinach have "bolted" to seed, his turnips have all been eaten off by "the fly," and the broccoli that should not have turned in their heads until winter, have buttoned prematurely through the forcing properties of the soil, whilst many annual flowers have absolutely withered away.

In a great many instances the cause of these difficulties is not far to seek, for much has been brought about by bad digging, followed by parching summers, and the mild winters experienced in the central and southern portions of the country.

Under these prevailing conditions a garden cannot be expected to produce satisfactory crops unless the soil is well dug and fortified with stimulants. To carry out this operation properly, it should be worked with a spade; if a man is called in to dig the ground it will be noticed that he uses a partly worn-out fork. Except upon very heavy clay soils this is an unsatisfactory form of digging, and very often it is only the surface that is pointed with the prongs, and in this manner the work is shuffled over; to the inexperienced eye the piece of ground looks as if it had been properly turned up, and is passed as ready for planting or sowing. If this goes on year after year the crops are certain to be more or less failures under adverse influences in the weather. The ground must be dug with a spade, which means a good deal of back-bending, and the soil turned over quite to the depth of the blade of the spade, the bottom part being thrown on top. This is digging in its proper sense, and should be done in winter, leaving the surface rough for the frost to act upon it. In well-regulated establishments the head gardener sees for himself that the work is properly carried out; consequently his crops are successful, in spite of the seasons.

Many plants send down roots 2 feet or more into the soil, therefore if the earth has only been disturbed year after year some 4 inches to 12 inches deep, it stands to reason these penetrating roots must come to a bottom more or less hardened, and in some cases sour and hungry. Now, if the soil had been thoroughly broken up to a depth of 2 feet, and some manure worked into it, all the nourishing substances would pass further through, and the roots would be able to work more freely, enabling the plant to withstand the droughts of summer, and in every other way encourage its well-doing. In some formations the good soil does not extend to a depth of 2 feet, but it is certainly an advantage, even where the bottom or subsoil is of a useless character for gardening purposes, that it should be loosened. This brings us to the operation of trenching, which is an elaborate form of digging, and is generally carried out as follows, although an experienced man does not require to work on such strictly defined lines.

Open a trench 24 inches wide and two spits (*i.e.*, two depths of the spade) deep, and wheel the soil taken out to the end of the ground where the work is to finish (see illustration, page 2). Next, thoroughly break up the soil at the bottom of the trench, and place thereon a layer of good manure some inches in depth. The top spit of the next 24 inches is then dug off and thrown into the bottom of the first trench, covering up the first layer of manure, another layer of manure is applied, and the bottom spit is then brought up and placed on the top of all. The workman should

carefully break up each spit of soil with the spade as the work proceeds. This system of digging, however, will not do in all cases. For instance, the bottom spit or subsoil is frequently sour, though not having been in contact with the air, and is, therefore, quite unfit for the growth of plants. Where the subsoil is bad proceed in the following manner: First, dig out a trench 2 feet wide and 1 foot deep, and convey the soil taken out to the further end of the plot to be dug. Next take a strong fork and thoroughly break up the subsoil to the depth of quite another foot; allow it to remain at the bottom of the trench, and over it place a good layer of any rough manure or decaying vegetable matter that may be handy. The top spit of soil from the next strip is then dug and thrown on the top of the manure in the trench, and when this is placed in position a second trench, 2 feet wide and 1 foot deep, is opened. Break up the subsoil, and proceed as before until the whole of the ground to be dug has been gone over. The soil taken away when opening the first trench will be available for filling up the last. By this system of digging the ground is well broken up to a depth of 2 feet, air and water pass readily through, and the subsoil gradually becomes sweet. Most of the work of digging, trenching and manuring is carried out after the crops have been taken off the ground at the end of autumn.

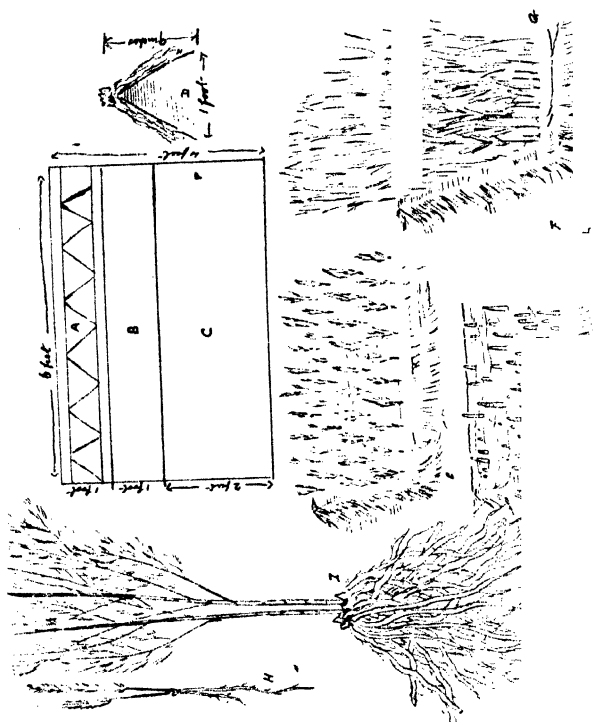
The trenching should be done as early in the winter as possible, to give the earth an opportunity to settle down before the sowing or planting season arrives. It is best to leave it in ridges thus:—



so that the rigours of the winter season may have the fullest opportunity of thoroughly searching and sweetening it.

In such a condition it will be quite easily levelled-up when required in the spring. This method is also one of the best for getting rid of much of the surface vermin which do not relish any disturbance in their winter quarters.

Spring digging is a waste of time and energy. All the advantages of winter are lost to garden ground left hard and solid through the frost and snowy season.



A.—Section of asparagus bed to scale, with ridges of roots, more plainly shown in D. B and C represent the depths of rich soil, C being more rough than B. E.—An asparagus bed the first year after planting. F.—An asparagus bed in bearing. G.—The growth on an asparagus bed after the cutting season is over. H.—A seedling asparagus. Its state about June, sown the previous November. I.—Its appearance the next summer.

HOW TO GROW ASPARAGUS.

Asparagus is a plant found growing wild on or near the sandy sea shore, where it produces under natural conditions a thin wiry growth of little use for edible purposes. In gardens asparagus is cultivated with great success in deep soils rendered rich by manure, and preferably upon a dry sub-soil. Cold, wet, strong clays, are less congenial to this plant, although in some instances I have observed excellent crops of it, particularly when such soils rested on a chalky sub-soil.

In preparing to form a new plantation, it will be found necessary to trench the whole space intended to be planted to the depth of 4 feet, if the workable soil reaches down that depth. As the process of trenching goes on, a good quantity of the best rotten dung should be added, and very carefully mixed with the soil from the bottom to the top—see chapter on trenching. If the soil be light or sandy, cow dung should be added (see end of article, page 10), and if of a strong clayey texture, lime rubbish and road-scrappings, or sand, may be incorporated with an unsparing hand. It should be remembered, that, as this crop is intended to occupy the ground for many years, the greatest pains should be taken to render the bed as rich towards the bottom as possible, as the roots penetrate very deeply. This work is done in autumn and winter. The ground being trenched and prepared as above directed, the beds should then be left to settle down for a few months. The width of an asparagus bed is generally under 6 feet (see illustration, page 6), so that it can be reached readily from either side. If more than one is made, an alley about 18 inches wide should be between them, but if only one bed is formed, it should still have a narrow space each side for walking upon, to weed and ultimately to cut the crop. It may be well to state that in the extreme south of England, beds are often made and planted in October, but it is risky to handle the roots where hard weather may prevail at a later period.

The best beds are made with asparagus roots, planted, when two years old, from seed. The plants can either be reared in a seed bed, or, as is more usual, bought from a nurseryman. They should be very carefully taken up with a fork and placed in a flat basket, covered over with a mat. It is of very great importance in the plant-

ing of asparagus to lift the roots carefully, and to expose them to the air as short a time as possible. No plant suffers in the roots more keenly than asparagus; the fibres are very brittle, and if broken do not very rapidly mend. The usual season for planting is March or April, and some cultivators are guided in this respect by the weather, and plant only when the buds are swelling on the crowns of the root. The most usual method of planting is the following:—"Stretch a line lengthways on the bed, 6 inches from the edge, and with a spade cut a V shaped trench, about 9 inches deep, turning the displaced earth to form a ridge, see illustration A, page 6, and, having the plants ready, set a row along the ridges, as shown in the illustration D, 12 inches apart, with a foot between the rows, the crown of the roots should be 3 inches below the surface when the final covering of soil is put on. Proceed then to open another trench a foot from the first and plant it in a similar manner.

As to the proper age to cut asparagus, none should be taken before the third year after planting. It is a common practice to sow onions, lettuce, and other crops, on asparagus beds during the first two years after their formation.

As to the duration of asparagus beds, much depends upon the soil and mode of management. In good soils, or on properly prepared beds, asparagus will last from five to ten years. Each autumn it is advisable to lay on a good covering of old dung. The strength out of this is washed down to the roots by the winter rains, and does a deal of good.

About the beginning or middle of March, it will be necessary to clean and tidy up the beds of this esteemed vegetable. Presuming that they were covered with rich dung in autumn, it will now be proper to remove the less decayed portion of it, and mix some soil in with what remains. The beds should be forked carefully to loosen the ground, to give free liberty for the buds to shoot up, and also give access to the sun, air, and the showers of rain. When the surface of the bed is all loosened up, let it be neatly raked over, and afterwards keep clear of weeds. The growths which appear during summer must be left until it withers about the end of September. Many of the stems will produce berries, these may be cut while the fruit is green, as it is a waste of energy to let them ripen. A dressing of salt over the surface is useful in the spring, in moist weather, if nothing is growing on the beds. Say sprinkling once a fortnight with an

intermediate liquid watering during late March and early April. Within a certain mark, about a handful to a square yard, salt is beneficial, but a heavy coating is not recommended.

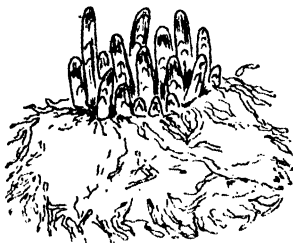
Asparagus is increased by seed, which it produces in abundance, and is in general sown in spring, sometimes in beds broadcast, and also in drills; the latter, however, is to be preferred. If sown in the broadcast manner, the beds must be kept during the summer completely free of weeds, and have the surface occasionally stirred with a small rake. In October the beds should be covered over with rotten dung, both for protection from the elements, and also to enrich the ground should the plants remain in it during a second year. Some prefer to plant them out when only one year old, while others prefer they remain two years in the seed-bed. The seeds should be sown thinly, and the plants given plenty of room by being afterwards thinned if necessary. During the droughts of summer they should be frequently watered, so as to obtain roots of a good size for transplanting into the beds where they are to remain to come to maturity.

Some care is needful when cutting the stems or the crown will be damaged. It is not advisable to plunge in the knife very deeply, as the root end of the stem is rarely eatable, about two inches under the surface is quite sufficient, and the roots from which it is taken will not suffer injury.

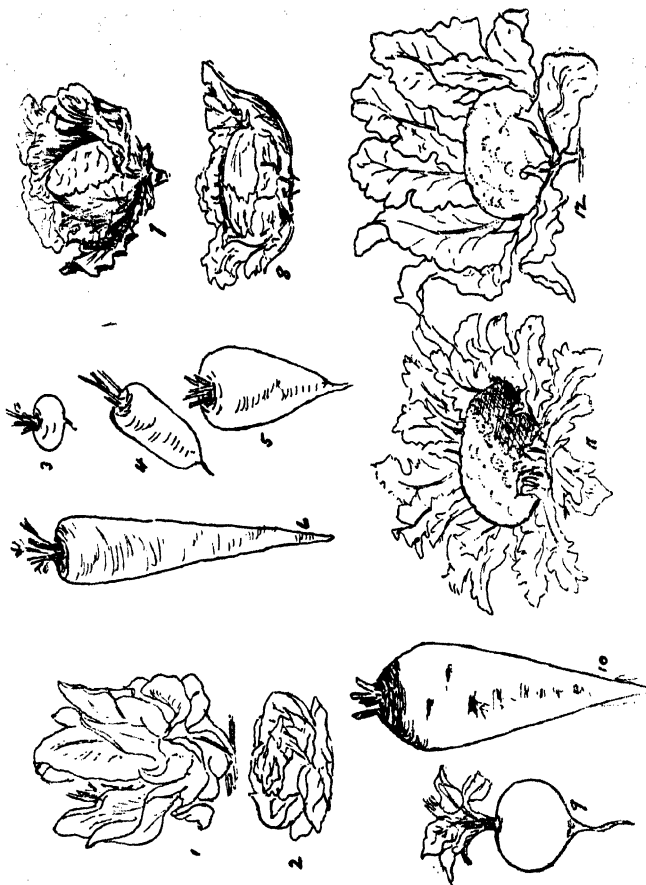
As an ounce of experience is worth a ton of theory, for the benefit of readers let me warn them against the advice usually tendered by writers regarding the depth at which the roots of asparagus should be planted. The giant productions exposed for sale in the shops are grown for market, and the whole of the white portion, which is almost unedible, has been produced underneath the surface, so that the roots cannot have been much less than a foot down. Now, my experience is this: These large roots are not worth the trouble of cooking, because they do not possess the flavour or quality of the vegetable as when produced by simpler means. If one goes into a restaurant and partakes of asparagus, it will be found that it is only the tips that are eatable, the rest is wasted, on account of its toughness. There is no getting away from the fact that to obtain the fullest flavour of tender stalks the growth must be produced above ground, the greener it is the better, and this should extend to quite three fourths of the stem, instead of merely tipping the points. The roots, therefore, when starting into activity in the

spring, should not be more than 3 inches under the surface, and the stems may be cut just below the ground after they have reached the height of say 9 inches, when more than half will be found edible. The nicest stems will be those not thicker than the finger. It is not advisable to cut after June, or the bed will exhaust itself.

Although I say that at the first planting the crowns will be about 3 inches under the surface, this depth serves as a protection until they get established, but in after years they will come nearer the top as the soil sinks, and beyond an autumn top dressing of manure, and loosening of the bed in spring, no heavy layers are necessary, for if the crowns are buried too deeply they do not thrive in the manner recommended. Many beds have suffered this last few years through want of moisture down at the points of the roots, particularly raised beds with a deep alley between. A good soaking during the early warm days of spring is beneficial, and often means the difference between a good and disappointing crop. Beds on light soils in the South of England may be made as follows: At the time of planting, which should not be before the middle of April, banish altogether the idea of raised beds, and cultivate the plant entirely upon the flat, seeking to raise the ground in the paths between the beds a few inches, this will enable the bed to hold a copious supply of manure water (see page 23). Feed with liquid manure monthly through the summer, and a coat of manure to cover the whole of the ground when the stems are cut down in the autumn. If ordinary yard dung cannot be had, then a handful of Peruvian guano added to each square yard of the bed is a useful dressing. Such rich food puts vigour into the roots in anticipation of the next season's crop.



A strong root of asparagus used for forcing purposes.



Types of Vegetables.

1.—Cos lettuce. 2.—Cabbage lettuce. 3.—Small-frame carrot. 4 and 5.—Medium-rooted carrots. 6.—Long red carrot. 7.—Summer cabbage. 8.—Drumhead cabbage. 9.—Round beet. 10.—Long beet. 11.—Broccoli. 12.—Cauliflower.

ARRANGEMENT OF A SMALL PLOT OF ABOUT 200 FEET IN LENGTH WITH VEGETABLES AND FRUIT.

- 6 feet.** Raspberries.
- 40 feet.** Red, White and Black Currants and Gooseberries, with an occasional Apple, Pear, Plum, or Cherry between, or they may be planted separately.
- 36 feet.** A bed of matured Strawberries.
Herbs, including Rhubarb and Seakale, on either side of Asparagus Alley.
An Asparagus Bed, 5 feet wide.
Main crop Peas, rows same distance apart as high.
- 18 feet.** Broad Beans.
Young Strawberry Bed with Lettuce between.
Spring and Summer Cabbage.
- 24 feet.** Rows of Beet, Carrot, Onion, Parsnip, according to requirements.
One end a Bed of Radishes, the other a Bed of Parsley.
Early Spinach, followed by a Row of Leeks.
Early Dwarf Peas, followed by Celery Trench.
- 20 feet.** Spinach, followed by Turnips, or Winter Cabbage, or autumn-sown Onions.
Dwarf French Beans, followed by Lettuce.
Hardy Cucumbers and Vegetable Marrow.
Tomatoes.
- 32 feet.** Main Crop Potatoes, say, 12 rows, with Kale, Savoy, and Brussel Sprouts, or Winter and Spring Broccoli between.
- 24 feet.** Scarlet Runners in rows.
Early Potatoes—say, 6 rows, 24 inches apart. Cauliflowers between.
Beds of spring-sown seeds for transplanting, &c.

This end should face the warmest aspect.
The measurements can be varied to suit Gardens of larger or smaller dimensions.

THE VEGETABLE GARDEN.

Gardening, like other fashions, is infectious; indeed, in no pursuit is imitation more potent than in matters horticultural. The enjoyment to be derived from a suburban residence depends principally on the knowledge of the resources which a garden, however small, is capable of affording, consistent with its limits and local situation. One enthusiast in this direction enkindles and sustains the interest of a district, and the success of his operations is the cause of much discussion amongst his friends less versed in the art. In this connection I offer a few remarks upon the site, formation, and arrangement of the vegetable portion, which should form the most important department of a suburban garden, as it contains the plants valuable for rendering other kinds of food palatable, besides possessing health-giving properties.

Although it does not fall to the lot of everyone to lay out the garden he occupies and enjoys, to those that have the opportunity I should recommend the selection, first, of a piece of ground moderately elevated, sloping towards the south-west, and sheltered on the north and east by distant clumps of trees. In the case of the colder aspect, sowing, planting, etc., will have to be delayed as much as two or three weeks, as it is of no use whatever to force the hand of Nature by sowing seeds several weeks before the seedling plants can possibly withstand the vicissitudes of the climate and situation. The soil preferred is a rich loam, 15 to 30 inches deep, and, if possible, overlaying a porous formation; this forms one of the very best soils for growing every description of vegetables in the highest degree of perfection. In size, its extent should be proportionate to the number of the family and their partiality for culinary vegetables or fruit, as the object in view in planting is rather to produce the kinds most serviceable than to grow a great variety. It ought not to be larger than can be conveniently cultivated, for the neatness and fertility so essential can only be attained by constant attention. Nothing can have a more unsightly appearance than a large garden not half cropped which is not kept in respectable order.

It may serve as some criterion in gauging expenses to state that the management of a kitchen garden occupying the space of one acre affords ample employment for a gardener, who will require an assistant for a few weeks in the autumn and spring of the year.

A wall of brick or stone, although unsightly, is the best fence, and wood comes next, but is much inferior, as it does not absorb the heat like bricks, which at certain season has a great influence on growth. The wall should not be lower than 6 feet, and may extend to any height within reason, but we must not consider the whole art of garden-making to consist in merely enclosing an acre or more of ground by a high wall, conducting walks through it, and planting it with various seeds and trees. The shape of the garden divisions must depend upon circumstances, but in a general way the following plan may be carried out: Make a border round the whole piece from 4 feet to 12 feet wide, according to the extent of ground available; next the border a walk from 3 feet to 6 feet wide; the centre of the garden may be divided into squares, on the walk sides of which a border should be laid out 3 feet to 6 feet wide, in which various kinds of low-growing plants, such as herbs and salads, may be raised, backed with trained fruit trees, gooseberries, currants, raspberries, and strawberries alternating. The middle portion may be planted with various kinds of vegetables. The outside border, which faces the south and west, will be useful for raising the earliest types, and the north border, being shady and cool, will serve for raising and pricking out young plants and cuttings that are required to be sheltered from the intense heat of the sun. The more simple the general arrangement, the more convenient will it be found in the subsequent cropping of the ground (see the idea shown in illustration on page 12, representing a piece of ground 200 feet long, by any width that meets the occasion).

The order in which successive crops are grown on the same compartment has very considerable influence in prolonging the continuance of the soil in fertility. Under regular systems of continued culture, distinct types of plants, according to their requirements, take out of the soil various nourishing constituents, and these have to be replaced by artificial means. Some vegetables are extremely impoverishing to the soil; it is, therefore, obvious that a

succession of these exhausting crops should never follow each other. As far as it can be rendered practicable, this important point should be borne in mind, that as the roots of different plants strike variously into the ground and their constituents vary, they absorb different matters; and so it happens that by arranging the peas and beans, the cabbage kinds, the bulbous or onion kinds, and lighter crops, as salads, etc., to follow in regular succession, the garden not only looks better, but to a certain degree produces the rotation required. In no case should any of the cabbage tribe follow one another upon the same piece of ground, nor should peas follow peas, nor beans beans. A plan of the garden should be kept, each portion of which should be numbered, and a record made of all crops, manurings, trenchings, and other work carried out each season. The change of crops is founded on an acknowledged fact that each sort of plant draws out a nourishment peculiar to itself.

We will take a bed of sea-kale or asparagus, the roots of which are large and have penetrated to a considerable depth, and which have remained in the ground for several years; further, they have exhausted the soil in which they grew of those parts which constituted their principal food, and, in consequence, they have ceased to thrive; then, instead of replanting the same piece of ground with young plants of the same vegetables, let them be entirely cleared away, the ground dug and cropped with peas or beans, whose roots do not penetrate to any great depth, and they will derive sufficient nourishment, different from what the asparagus required. In like manner let sea-kale or asparagus succeed some crop of a light description, such as any of the common annual culinary vegetables.

The following classification may be considered a useful illustration of the various types of garden products, and gives a good idea of successional croppings in an ordinary garden. The table is based upon the recommendation of eminent gardeners, who have found in practice that celery constitutes an excellent preparation for asparagus, onions, and cauliflowers. Turnips or potatoes are a good preparation for cabbages or greens. Broccoli or cabbages are a proper preparation for beans or peas. Cauliflowers prepare well for onions, leeks, or turnips. Old asparagus beds afford a

In some establishments, where large quantities are required, a plan is adopted that will ensure a rapid succession of crops. This system of continuous cropping greatly exhausts the soil, and to meet it heavy applications of manure become a necessity. The early potatoes are planted in wide rows, say, 3 feet apart, between these rows are put late peas, cauliflowers, and summer cabbages. Between the rows of the peas, lettuce and spinach will thrive, or on top of the celery trenches lettuce will also mature. Dwarf beans are planted between carrots and beet. As soon as the early potatoes are off, some lines of turnips may be put in, and between these winter greens and broccoli are planted. So that with one sowing and another the ground at command is always occupied with crops coming forward.

The kitchen garden in spring generally carries its cleanest face, and it is not until the warmth of the sun has penetrated the soil that the seeds of common wild plants come up in myriads, and their tenacity to places where they are least wanted is remarkable. It is of the greatest importance that their removal be effected while young, and before the flowers have sufficient time to develop and ripen their seed, otherwise the cultivator will be constantly tormented with fresh batches after every heavy fall of rain. It is an old adage, and a very true one, that "one year's seeding entails seven years' weeding."

The best and cleanest mode of keeping walks free from weeds is never to permit them to remain long enough to produce flowers. There are various modes of keeping down weeds, of which the use of salt is one, but it is only effective when applied in dry weather ;

All soils are teeming with the seeds of indigenous weeds down to any depth we like to go, and they haunt our crops as though they were masters of the situation. Weeds are of three classes—annual, biennial, and perennial. An accurate knowledge of the life, habits, and the exact classification of any weed is needful to enable one to decide how to eradicate it. Thus, if the stems of an annual be severed from the root the plant will die, because the root left behind in the ground has neither buds nor organs capable of producing them. If the stem of a biennial be cut below the junction of the crown with the tap root, it is killed, but if it be cut above the junction of the crown and the root, the very reverse result follows, and in a day or two it will throw up in the same spot half a dozen vigorous growths. This increased number of stems is developed from the cut crown left in the ground, and there is all the difference in the world between the effectual and non-effectual cutting of biennial and perennial weeds.

That there may be no waste, there ought to be a place to wheel and burn all rakings, sweepings, and gatherings of weeds, as during the year there are great accumulations of this kind in most gardens. The ashes of vegetable matter, of whatever nature, are valuable, as they are the food of plants, and the more ashes the soil has returned to it the less it is robbed.

There are some points in the production of vegetables which ought never to be lost sight of, and one of the first of these is a liberal and judicious thinning at the proper time, for it would be wrong to delay the operation until the plants have injured each other by crowding too thickly in the line or bed. It is necessary, owing to the depredations of vermin, to sow much more thickly than would otherwise be the case, and a good thick crop of seedlings must be thinned out. In fields it is done with the hoe, but in gardens more care is needed and it is undertaken by hand. Vegetables spoil through being planted too thickly; the result is likewise greatly prejudiced if both the sun and rain cannot get readily to warm and moisten the roots. The thinnings of onions should not be thrown away, but eaten as a salad. A clever cook knows well how to smother the pungent odour that is attached to this vegetable; one tells us that a lengthy immersion in salt and water goes far to lessen it. Both these and beet, carrots, parsnips, and turnips must be thinned from 6 inches to 12 inches apart, according to the variety grown; any gaps may be filled up with some of the plants taken out.

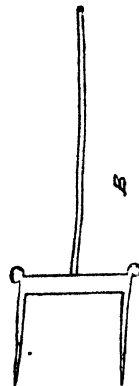
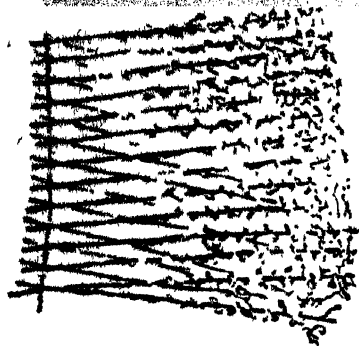
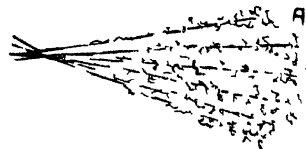
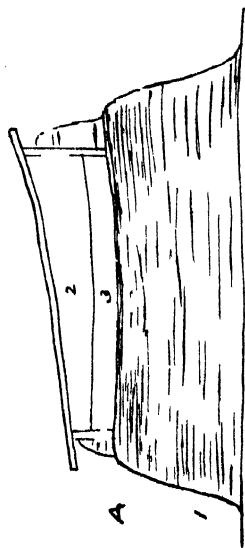
In a small garden it is best to use a crop such as spinach, just as it comes; that is to say, the plants should be lifted in quantities as wanted, roots and all. If thinned out and left to get large it may be found, during a spell of hot weather, that they have all of a sudden run away to seed. In this state the leaves are tough, and not nearly so inviting when cooked. This system will be called an extravagant one, and it would rightly be so in a large garden, but a succession of sowings maintains the supply through the summer, and, after all, the amateur gardener prefers quality upon his table to quantity. Always gather succulent leafage of this description early in the morning, when the dew is on it.

USEFUL NOTES.

TRANSPLANTING ONIONS.—Here is the receipt of Mr. E. Beckett, the Champion Vegetable grower. "The seed should be sown thinly in boxes during January or February in a moderately rich compost, which should be used in a fairly dry state and pressed down firmly, and the boxes placed in a gentle growing temperature. As soon as the seedlings are large enough to handle these should be pricked out into other boxes, again making the soil very firm. Grow on in a gentle heat, but afford them all the light possible so that they do not become drawn. Gradually harden off in cold frames and plant out the first favourable opportunity on rich and well-prepared ground in April, disturbing the roots as little as possible. The plants ought not to receive a check at any time, and in the case of those that have not the convenience it will be far better to defer sowing till the middle of April, when the young plants can be nursed along more easily. To procure the best results it is absolutely necessary that a good strain should be procured and the ripening process should be carefully carried out, which will then ensure the bulbs keeping. These are often left in the ground for too long with the hope that the size will be increased, which is generally at the expense of their keeping properly and of that high finish which should always be the aim of the cultivator."

LEEKs are in great favour with most people and may be grown to a large size and of fine quality by being treated in the same way as celery; but an easier way of managing, and one generally attended with good results, is to make deep holes in a rich piece of ground with a large dibble, and drop the Leeks in, about 6 inches apart, when by giving a little water, sufficient soil is washed down to cover the roots, and the plants soon get a firm hold and make a good start. By such a method water is readily applied, and as they get larger the holes can be filled up.

SEAKALE is past its prime in June. In a large establishment fresh roots are procured and planted each winter, but in small gardens they are often made to do duty for two or three seasons before worn out. Encourage leaves, but cut out all flowers.



A.—Hot-bed. 1.—Stable Manure. 2.—Frame. 3.—A lining of soil. B.—A movable garden scraper.
C.—How to stake runner beans in a row. D.—In a circle. See text.

HOW TO GROW BEANS.

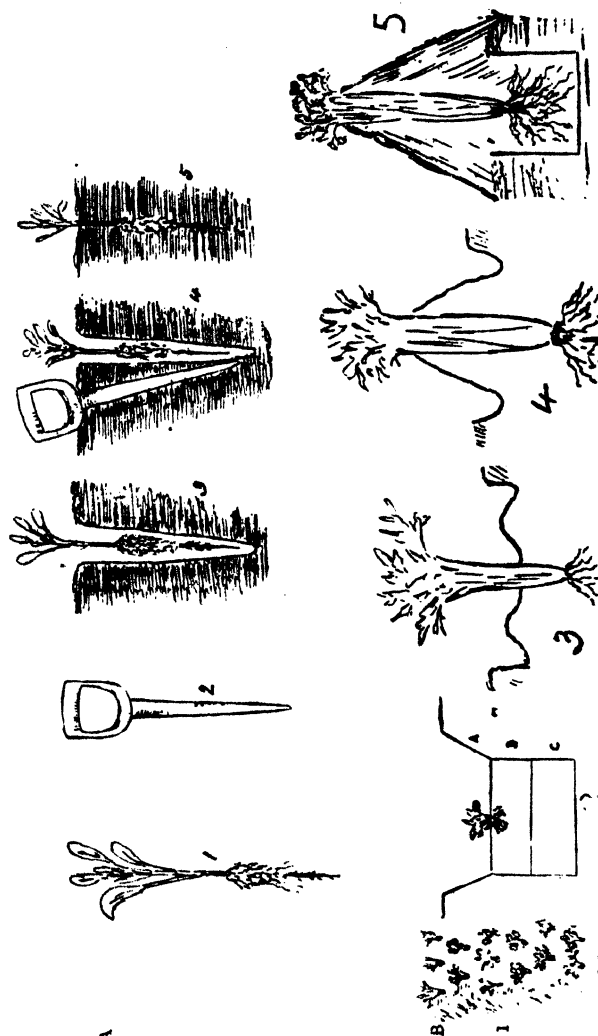
The broad bean is a very hardy vegetable, and the soil most suitable is a strong, rich garden loam, into which plenty of well-rotted dung has been mixed. In an ordinary garden the seed is sown in February and March, and unless the situation is a very bleak one it is best to get it planted as soon as possible, so that the young plants may get a good start before a warmer time sets in. Customs vary in different localities as to how the seed shall be sown, but there is no doubt no system beats a single line. Some recommend the seed being put in with a dibble, but this method I do not hold with; I much prefer a shallow trench being made with a spade—say about 3 inches deep and 4 inches wide—running from north to south, so that both sides of the row may reap the full benefit of the sunlight, and into this the beans should be pressed with the eye side downwards about 3 inches apart. When covered up with soil tread them down lightly, so that when they grow an inch or two they will have reached the surface level, rake more earth up to them, and they will require no more individual attention, unless they appear too thickly sown, when it is easy to thin some of them out. If necessary to put in more than one row, the lines should be about 3 feet apart, and the soil on either side kept constantly stirred with a Dutch hoe as soon as the plants begin to show strongly above the surface. In districts where there is much wind it is advisable to stake them; the simplest plan is to put two stakes at each end of the row, so that they stand about 2 feet high when driven into the soil, and two rows of string from these run along the row with a support here and there will materially protect the bean stems from being blown over by sudden gusts. In some localities, especially where the soil is dry, the tops of the growth are liable to be attacked by a black fly which, if permitted to remain, will soon spread over the whole plant. Directly it appears the points of the plant should be nipped out and burned. Independent of the insect, the stopping of the plant has a tendency to perfect the pods already showing, and there should always be enough fruits on the stem when they are stopped to yield a good crop. If it is the intention of the cultivator to exhibit the beans, it is best to place a stake to each plant separately, and also take

The dwarf or French bean is very popular in all gardens. Being very tender it will not stand the slightest frost, and therefore should not be sown until the heat of the sunshine has penetrated into the soil. It is difficult to mention any precise date, but from the middle of April in the southern counties to the middle of May in the north is a suitable time for the first sowing to be made out of doors. Further sowings at intervals of three weeks up to July will ensure a prolongation of the crop through the summer. In growth this type of bean is bushy, and occupies but little space in the ground. In a moist summer the growth is very robust, and under such circumstances the plants should be thinned out to 12 inches apart, as the more air they get the more prolific will be the crop. They prefer a light, rich soil in a sunny position, and to check the depredations of slugs and grubs, which have a strong liking for this bean when young, the rows should be frequently dusted with soot and lime. The pods should be carefully picked, or the plant may be pulled up. They are nicer when gathered young, and the plants last longer. Some kinds recently introduced do not require stringing, which makes them liked by the cooks because they save time in the preparation. If required for exhibition purposes, not more than eight pods should be allowed to remain on a plant, and when exhibited they should be young, straight, and of good colour, and as nearly as possible all the same length. About twenty-five pods is the number generally required.

Runner or climbing beans are also an acceptable vegetable, and can be grown in a similar manner, but require more room in every

direction. The old-fashioned custom of one row across the garden is still in vogue and preferred by some growers, but a more fashionable plan is to sow a few beans here and there along the border, and train them to sticks arranged in a circle or some other artistic form (see illustration page 20). The stakes should be about 7 feet high, 9 inches apart in the rows, with 1 foot between the two rows. These make very effective ornaments, and look much prettier than when in a simple row. The scarlet runner can also be grown in a dwarf form, such as is seen in field cultivation. All that is necessary is to pinch out the points of the running shoots when they appear. The pods then come close to the plants, as in the dwarf bean. Where stakes are scarce this is a very economical method of cultivation. As with the dwarf bean, frequent picking prolongs its cropping power, which extends into November. This bean often fails to set its fruits because of dryness at the roots and needs copious supplies of water in arid seasons.

A USEFUL LIQUID MANURE.—An excellent garden manure can be made by any one having access to a hen house, pigeon loft, or cow stable. We prefer hen manure, as it gives the foliage of plants a richer dark colour than any other. Take a quantity of hen manure, from one quart to a bushel, according to the number of plants you keep, put it into a water-tight vessel, and pour on to it enough boiling water to considerably more than cover it. Throw old sacks over it to keep in the steam. Stir once or twice, then allow to stand, still covered a few days. Draw off the liquid, and if you did not use too much water in making, it will be as dark as strong coffee. When using, add enough of the liquid to the water with which to water your plants to give it the colour of very weak tea, and give it to crops once a fortnight. You will be surprised and gratified with the result. This is an excellent fertilizer for plants in the open ground, where it can be used a little stronger than on pot plants. Liquid manure given to trees should always be used after rain: it is simply wasted when poured on to parched soil. It aids trees carrying full crops, to perfect them. It may also be given to weakly trees when dormant, as a soil enricher.



A.—. A Cabbage Plant. 2. Dibble. 3. Plant set into hole made by dibble. 4. Tightening the plant with dibble. 5. Planted correctly.

B.—1. Young Celery plants on border, transferred from seed-pan. 2.—A. Showing plant in trench.—B. Three inches of nicely worked soil.—C. Three inches of dung. 3. First earthing up. 4. Second earthing up. 5. Showing Celery earthed up ready for use in autumn (*see pages 30 and 68*).

HOW TO GROW CABBAGE, BROCCOLI, CAULIFLOWER, KALE, &c.

To the cabbage family belong some of the most important plants cultivated in gardens for culinary use, and which may be looked upon as a national vegetable, for each country seems to have a popular dish in which it takes a leading part. With the Germans it is sauerkraut, with the French cabbage soup, with the English it is cabbage, boiled pure and simple, with the Scotch it is kale brose, with the Welsh it is curly greens, with the Russian it is filled cabbage, and America, with a population of mixed nationalities, adopts the lot. It embraces the numerous varieties of cauliflower, broccoli, borecole or kale, colewort, brussels sprouts, and savoy. The innumerable varieties found in seedsmen's lists arise from constant efforts on the part of expert cultivators, who have for generations perpetuated traits of character that have manifested themselves on various soils and situations, and continued re-selection of the best types showing the objects sought after. The valuable part of a cabbage is its solid head or heart, and the perfect development of this in any particular variety is the result of breeding and transmission of certain characteristics from one generation to another.

The food properties of the cabbage place it in the first rank as a vegetable, yet very few English cooks know how to treat it, with the result that the dish is considered one for vulgar tastes only.

With regard to its cultivation: First of all comes the application of manure, and nothing is better for the cabbage tribe than old yard manure—that is, straw taken from the stables, stacked in a heap, and permitted to rot before use. Two barrow-loads should be applied to every rod, pole, or perch, a space we may call six yards by five yards, during the winter, and turned into the ground when it is deeply dug. The cabbage is propagated by seed, the first sowing of which may be made in March, on a sheltered border, or in a frame. The plants produced, when transplanted into their permanent quarters, will come into use after those which were sown in

August of last year and transplanted in the autumn and winter for spring and summer use. Sowings may be repeated through April, and again at the beginning of August, and thus, by well-executed systems of culture, a constant supply of plants is afforded. These August-sown seeds produce what are called "spring cabbage"—that is to say, they are ready for cutting from March to June. They should be transplanted about twelve inches apart—we give this short distance so that during growth every other plant may be cut out for eating when young, and the others will remain to mature later in the season; they should be planted in a firm soil, or some may bolt away to seed instead of showing signs of producing a heart. Rapidity of growth ensured through richness in soil, constant hoeing, and ample supplies of water and liquid manures during dry periods, are the great considerations for this class of vegetable, as the flavour depends in a great measure upon early maturity induced by good cultivation.

What are called summer cabbages are sown in March and transplanted when large enough, to come into use during the summer. They are often put out between rows of potatoes about 2 feet apart. Some of the larger types that are sown in August are not fit for cutting until the following summer. Autumn cabbages are also sown in spring and transplanted in summer; they are generally hard-headed varieties, that take longer to mature, and stand about 2½ feet apart; they come into use after the smaller and quicker growing summer cabbages are over. The red or pickling cabbage prefers a rich strong soil. If an early type is planted in spring the heads will be useful for gathering by the end of summer. These are usually set out about 20 inches apart, and there is a larger variety that takes longer to mature. This is planted 2½ feet apart, and when sown in August and transplanted in the autumn in the southern and inland counties, or in cold northern soils in the spring, some huge specimens may be obtained by the summer following. Small red cabbage makes a capital dish when boiled, and the larger variety, if cut when the heads are hard, will keep for a long time hung up in a cool shed, losing only a few of the outer leaves.

The stumps of cabbages from which the heads have been cut in the autumn will produce some fine sprouts that are most useful during winter and spring. They should be gathered before they come

into bloom, but with regard to the stalks of those cut in the early summer, directly the head is off the remaining leaves should be taken off the stem, and as soon as fresh buds start, rub all off except two of the strongest, one at each side of the stem. These will grow into heads almost equalling the first crop in flavour and appearance, and are altogether a most economical second crop.

When cabbages are transplanted during the summer, dull weather should be selected. If at all hot and dry a good plan is to make a hole when planting, a foot deep with the dibble, and half-fill it with a compost of wood ashes, soot, and earth, mixed to the consistency of thin paint (this is what is called "puddling-in" the plants, and is a good check to "clubbing," which bears the appearance of knobs attached to the roots, and is caused by an insect); into this the root of the plant should be inserted straight down (see illustration pages 24 and 75); then put the dibble into the soil about a couple of inches away from the hole, pressing it tight towards the plant; fill up the second hole made, first with water, and about an hour afterwards with some of the surrounding soil, and tread it in. A slight sprinkling of salt and water over cabbages during showery evenings in the summer is beneficial (say a handful to a couple of gallons); it not only gives the leaves a fine dark colour, but it also checks the ravages of the cabbage caterpillar, which is produced from eggs laid under the leaves during the hot sunny days by the common white butterfly. The soil should be kept well stirred with the hoe to sweeten the surroundings and let the rain in when it falls. If the surface is hard the rain cannot get down to the roots.

For the information of those who grow cabbages for exhibition, the heads must be very firm, and three specimens are generally required, which should be as much alike as possible.

BROCCOLI.—In the early stages this is treated somewhat the same as spring-sown cabbage. The name of the variety generally indicates the season at which it may be expected to produce its hearts—that is to say, autumn broccoli will be fit to cut in the autumn, winter white comes in during winter, spring white in spring, and summer during the following summer. From this it will be gathered that the broccoli can be had in bearing nearly all the year round, in conjunction with the cauliflower, which type, as a rule, is in

bearing during the summer and autumn. The earliest should be arranged to come in when the latest broccoli is just over.

CAULIFLOWER.—A refined form of broccoli, much quicker in coming to maturity, and more tender. During the young stages it is treated similarly, only that it is safest to rear the seedlings under glass. The spring-sown plants, which are more delicate than the cabbage and broccoli, will come into use under ordinary cultivation from August to November, according to the sorts grown. In large establishments, where they are wanted in early summer, some quick-flowering type is grown in pots kept under glass.

COLEWORT is a type of cabbage that comes into bearing in the summer when sown in the spring, and when sown in June it is ready in the autumn and winter. It is a small, loose-headed plant, and sold under the name of bunch greens. It can be planted closer together than the cabbage (say, 1 foot apart), as it does not spread out.

KALE.—This hardy type is popularly known as curly greens, and its culture is very similar to that of the cabbage. It comes into use in winter and spring, and is always more tasty after its leaves have been visited with one or two severe frosts. After the leaves themselves have been gathered, the stems will furnish a further supply of useful sprouts, which can be picked until the time when the flowers come in spring, when they commence to get tough and leathery. The plants should then be pulled up and thrown away. The seed is sown in the spring, and the plants are put out like cabbages—the tall varieties $2\frac{1}{2}$ feet apart, the dwarf varieties $1\frac{1}{2}$ feet. There are many sorts, some with quite plain leaves, others crimped, others quite mossy, and beautifully variegated. The popular type is known as Scotch kale, available in two sorts—dwarf and tall. Asparagus kale is another very hardy type, which throws out succulent green shoots early in spring. These are gathered, and served up like asparagus. It is sown in April, and treated like other kales.

COUVE TRONCHUDA.—A loose-headed Continental cabbage. The ribs of the leaves are very fleshy, and make a nice dish when cooked and served up with sauce. It is sown in spring like ordinary cabbage, and cut after the plants have been touched with frost towards the end of the year.

BRUSSELS SPROUTS.—The treatment of this vegetable is very similar to that recommended in the cultivation of the autumn cabbage, bearing in mind that the richer and stronger the soil the finer will be the sprouts; but it must be firm, or they will not be solid. If the seed is sown in March the sprouts should be fit for gathering in the autumn; if sown in April they will be ready in early winter. They are far nicer if left until one or two severe frosts have visited the locality, as it makes them eat more tender. Some growers cut off the heads with the idea of improving the sprouts, but we must confess we could never see any advantage in it. For exhibition purposes it is not necessary to take the very largest sprouts. Those that are very firm and medium in size, and of a good dark colour, are preferred by the judges. Twenty-five to thirty are generally the number requisite to make a dish.

SAVOY.—A very hardy type of cabbage from Southern Europe, and is at its best in autumn and winter. It possesses a flavour peculiar to itself, which is best appreciated after the plants have had a severe frost upon them. The seed is sown in spring, and the plants are transplanted during summer like the cabbage, from 1 to 2 feet apart, according to the variety selected.



1. —Cottagers' Kale. 2.—Curly Kale. 3.—Curled Savoy. 4.—Rosette Colewort.

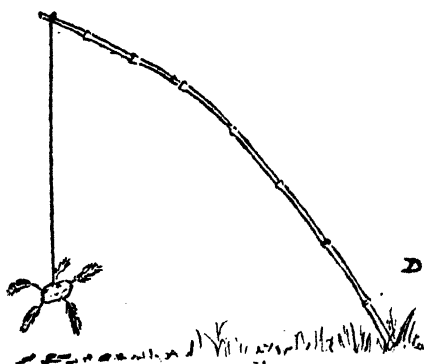
HOW TO GROW CELERY.

It is seldom one sees a good trench of celery in an amateur's garden, generally because the soil is not rich enough to carry the crop through the summer, and very often dryness at the root assists in checking the growth, and the plants when lifted, instead of being a mass of tender stems, are often starting to go to seed. There are two kinds of celery, the pink and the white. The pink is the strongest growing, and should be selected by those who are fond of soups flavoured with this vegetable; although it is very crisp and flavoury for general eating, the white is perhaps the best for table use. Early in June the young plants should be quite ready for transplanting from the seedpan out into a border about four inches apart. From this they are transferred, generally during July, to a trench which has already been specially prepared, twelve inches deep, with some nice, old, mellow manure dug into the bottom, and well watered and filled up with a finer material to within six inches of the surface level, which is better than going lower, as the celery has the good soil to grow in, and makes much better quality sticks than are ever seen in the grave-like trenches some go to the trouble of making, and in which the heads grow coarse and rank. Into this the plants are inserted about 9 inches apart, either in a single row or, as is the fashion nowadays, to make several rows in the one channel, but sufficient width must be given for each plant to mature. During the summer, if several rows are grown, the earth may be filled in flat in between each plant, first of all holding the leaves together. If only a single row is grown the plants will require earthing up each side as they advance in length.

As the celery is naturally a swamp plant, plenty of water is required during the hot season, and the richer the soil the stronger they will grow. What causes celery to run to seed is the check it gets in the beds through want of water, where it ought to be kept very moist, as it is half aquatic in its nature. For those who have not the convenience of rearing the plants under glass, the seeds may be sown on a warm border, and the treatment followed as already stated. Under this system the heads will not be nearly so large when lifted as those which were started earlier. Earthing up should be done gradually, choosing dry days for the work. The

work should not be commenced until the points of the leaves are well above the surface level, and the operator must be careful not to bury the crown of the plant, or its growth will be seriously hampered. It must be done gradually. The last earthing up will only leave the tips visible (see illustration page 24). Some gardeners earth up the dwarf white variety just the same as the robust red kinds. This is a mistake, as the heavy covering of soil often cripples the growth of the stem. A peppering of lime and soot over the plants early in the morning, when wet with dew, checks the depredations of both the fly and maggot so troublesome on the leaves and down the stems, in some localities.

Some growers use bands of medicated brown paper for placing round the stems during growth. This is certainly a protection against vermin, and gives the stem a clean appearance, but the band requires to be put on before the plant is finally earthed up. Three heads are generally wanted on the exhibition table, and they should match each other as nearly as possible. For this purpose the heads should be clean and free from worm-eaten places. See chapter on earthing up, page 68.



A simple device to keep birds off seed beds, made of a bamboo cane and a piece of string with a potato at the end, into which is inserted several feathers.

HOW TO GROW CUCUMBERS OUT OF DOORS.

Outdoor or ridge cucumbers, as they are commonly called, should be grown by all who have no pit, frame, or glasshouse for the more tender varieties. They may be raised, grown, and fruited successfully in the open air from June until the end of September. Those desirous of having cucumbers without the aid of hot-beds or any other artificial assistance should make a raised heap in a sunny but sheltered portion of the garden, and into the surface centre of this put about half a bushel of rich potting soil, well watered and made fairly firm. After this has had one day's hot sun on it, press in four seeds, about 4 inches apart, in a square, and cover them about 1 inch deep. Sprinkle the surface and cover with a handlight, or, failing this, place a large pot upside down over the seed bed, and keep it there for a few days until the seedlings appear, when it should be raised during the day, just sufficiently to let in light, but not strong sunshine. Directly the two flat seed leaves are well above the soil the pot may be taken away and a sheet of dark-coloured paper laid over on sticks about 6 inches above the ground. This should remain for a few days until the seedlings look hardened. With the handlight it will only require shading during sunny hours. As soon as the plants are up no protection is necessary beyond a ring of soot or wood ashes to keep slugs away, and when the growth has crept about 9 inches pinch out the point to induce early fruiting.



Garlic.

MANURES.

The application of stable manure has already been referred to, but some mention of the highly concentrated compounds now so popular must be made, as they are of great value at seasons and in situations where it is not always convenient to use a dressing of dung.

RULES FOR MANURING.

There are three rules to govern the adaptation of fertilisers to crops:

1. Foliage or leaf-producing plants require liberal use of potash and nitrogen.

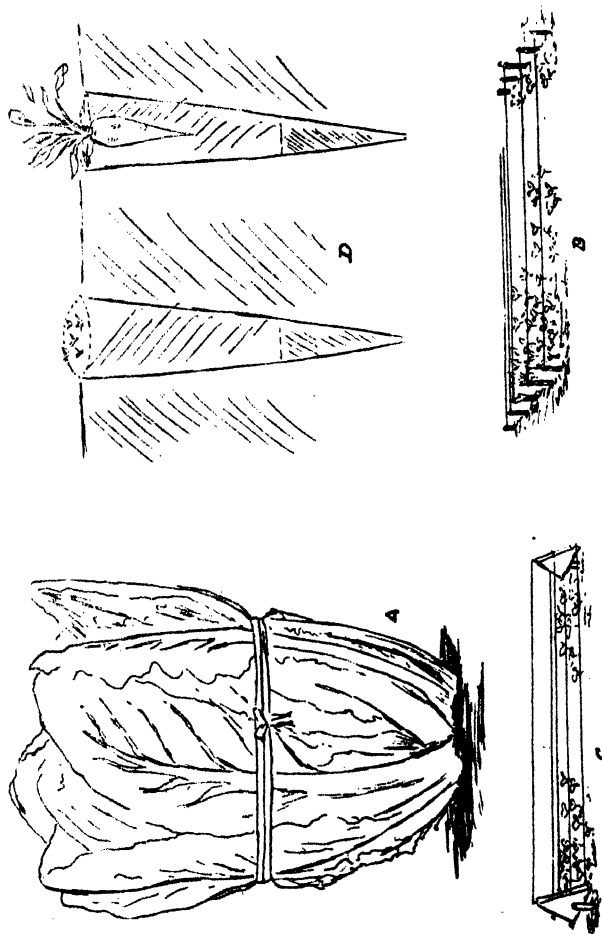
2. Fruit or seed-producing plants need more phosphoric acid and less potash than the preceding.

3. Root crops are particularly benefited by the use of potash. They require more phosphoric acid than under 1, and less than under 2.

HOW AND WHEN TO APPLY MANURES.

Name.	Applied to	Sq. Yd.	Per Rod.	Season.
Guano	All crops	2 oz.	3 $\frac{3}{4}$ lbs.	During growth
Superphosphate	Turnips, Cabbage, Peas	3 "	5 "	Spring
Salt	Cabbage, Beet	2 "	3 $\frac{3}{4}$ "	Spring and Autumn
Soot	All crops	4 "	8 "	Spring and Summer
Nitrate of Soda	Cabbage, grass	2 "	3 $\frac{3}{4}$ "	During young growth
Sulphate of Am- monia	Leafy crops	1 $\frac{1}{2}$ "	2 $\frac{3}{4}$ "	During young growth
Sulphate of Pot- ash	Root crops	2 "	3 $\frac{3}{4}$ "	Winter
Basic Slag	Grass and Clover	4 "	7 "	Autumn
Bones	All crops	2 "	3 $\frac{3}{4}$ "	Spring and Autumn

Most nurserymen and seedsmen supply what is called a complete manure made up from the above ingredients after some recognised formula. Full directions are generally given on the packages.



A.—How to tie a cos lettuce to solidify the heart. B.—Rows of black cotton over seed beds.

C.—A useful protection to young peas; made of black cotton on a triangle stretcher.

D.—How to grow exhibition beet and carrots. See page 47.

HOW TO GROW PEAS.

The pea is one of the most popular of vegetables, and is available in such great variety that the amateur is puzzled how to make a choice. During the last twenty years an important advance has been made both in earliness and size of pod, and the cultivator is now able to obtain for the first pickings of the season some fine types which bear enormous pods with plenty of large-size peas inside them. Garden peas succeed best in deeply-dug ground, made firm, and enriched with well-decayed manure, mixed with pieces of turfy soil, but on no account must fresh stable manure be used. The roots readily penetrate into this compost, and the crop will last much longer in bearing than when the seed is sown on ground that has had no special preparation. It is the poverty of the subsoil where the roots are feeding, and when they most need support at the time the plants are cropping, that causes them to mildew, shrivel up, and prematurely ripen. A good method of procedure for amateurs is as follows: Throw out the soil to a depth of 15 inches, and put into the trench the good material mentioned above to the depth of 5 inches, then replace 4 inches of soil made firm. This will still leave about 6 inches below the surface level. The seeds should be sown in zigzag rows, from 2 inches deep in heavy soils to 3 inches deep in light soils, the individual seed being about 2 inches apart, and carefully covered with soil, pressed down by treading with the foot. The rows should run from north to south, so that the whole of the growth may receive full benefit from the sun, otherwise nearly all the pods will be produced on one side.

A really good marrowfat pea should be of a sturdy habit and constitution likely to withstand extremes of weather. A free and continuous bearer of pods well filled with peas of the best flavour when cooked—these are its chief characteristics. The leading seed merchants have their own perpetuated strains, to which they give attractive names, and some of these special varieties become exceedingly popular. Experience with various seasons and the capabilities of a particular locality is also of the greatest assistance in helping to find varieties likely to suit the soil and situation.

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A common cause of failure in the cultivation of peas is the fact that the seed is sown too early, and the growth is not sufficiently hardy to withstand the vicissitudes of our uncertain climate. This remark applies not so much to the small early peas that have hitherto been cultivated for first use, but to the sweet marrowfats that everyone prefers, and which should not be put into the ground, particularly in exposed districts, until the influence of the sun has taken some of the winter's cold out of it, so that unless under special circumstances of soil and situation these peas should not be sown until the end of March, or later if the weather is then unfavourable, or many of them will rot in the ground, and become injured by keen winds and late frosts. On light soils or in warm situations in the South of England sowings may be made a week or so earlier. When a proper selection is made successional sowings should give pickings from early June to the end of September.

When peas are sown too thickly the haulms springing from the individual seed have not room to develop into the healthy growth necessary for the production of satisfactory results; all the same, it is advisable to sow rather thickly in anticipation of the depredations of vermin both under and above the ground. Peas stated to grow 2 feet high will be all the better if allowed $2\frac{1}{2}$ feet between the rows, and so on throughout the various classes, so that 5 feet peas should have a distance of about 6 feet. The plants thrive best when they have ample space, light, and air, and continue giving finer produce over a longer period; besides, low growing crops planted between stand a better chance. Such distances give plenty of room to hoe and keep the surface clean, and the crops can be gathered with a minimum of injury to the haulm.

However dwarf the variety, it is best to have some kind of stick support in case wind and weather blows the growth about. They can be thrust into the ground some inches from the peas, so as not to touch the tender roots, and in a sloping direction to lean over the peas, every alternate stick being upon the opposite side; the taller sorts may be permitted to grow 9 inches before they are stuck. We have never seen successful results with wire supports, to which the tendrils do not readily adhere, and nothing beats the old-time birch twigs.

Sparrows are very partial to peas. Two or three lines of black cotton stretched over the rows will keep them off while dwarf (see illustration page 34), but it is not easy to keep the birds away when they get taller and are in pod. Soot sprinkled over the young growth while damp will preserve them from slugs until the next rain, when it is necessary to repeat the operation. Many slugs may be caught by walking up the rows at night with a lantern and making a close examination, or after a shower on a June evening. As to mice, the only way to deal with them, if troublesome, is to set a few penny traps with some tempting bait, such as a piece of strong cheese.

As soon as the plants have made 2 inches of growth above the soil they should have a little earth drawn up to them on either side, the operation to be repeated when they are about a foot high, and later on a dressing of short dung laid on the surface, to the thickness of 4 inches and width of 12 inches respectively on each side of the row, will maintain the roots in a more uniform condition as regards moisture than could otherwise be obtained. Then, again, in hot, dry weather, each time water is applied it will wash the virtues of the manure down to the roots, and assist to considerably extend the cropping period. There must be method in the manner of watering, and a good soaking once a week is better than a daily dribble. See page 74.

The stems should not be satiated with water, but through a furrow drawn with the hoe about a foot away each side. The water will percolate down to the roots without making a deal of show on top. In sowing the later peas during hot, dry weather, the operation should be undertaken early in the morning, and it is advantageous to water the drills thoroughly before the seed is deposited in the ground. This will help it to germinate readily. A good sprinkling of lime, soot, and wood ashes in equal proportions along the drills before sowing is highly advantageous to the peas, as it not only helps to keep the ground vermin away but acts as a valuable manure, as such a prescription contains properties required by the pea, and which are usually deficient in garden soils. Lime, in particular, adds flavour to the peas. The pods should be cut off, not pulled, or the plants may be dragged up at the roots.

The cultivation of the pea for exhibition purposes is something quite special. For the benefit of those who go in for showing we give the following information: The early sowings are generally made in shallow wood boxes. Some growers sow the seed in pieces of turf cut 2 inches deep and in 3 inch blocks, one seed in each piece one inch deep; they root freely into this, and in this form are readily planted out. These turves are placed in boxes in a cool house so that they may germinate without the slightest forcing. Directly they start to grow the boxes are moved to the fullest airy light to maintain a sturdy growth. When thoroughly hardened off they should be planted out in a well-prepared drill in single rows, with about 3 inches between the plants. Care must be taken to see that they are protected both from cold nights, insects, and from birds, and if the weather is dry water must be applied. Stick as soon as they appear to require it, and directly the third or fourth bloom-buds burst the point of the growth should be carefully pinched off. It is these early blooms that generally produce the finest pods. The rows must be thoroughly mulched with old manure, and plenty of water applied during dry times. Successional sowings may be made up for service at later exhibitions, in accordance with directions given in the earlier part of this article. Fifty pods are generally required on the exhibition table, and they should be as nearly alike as possible, that is to say, the pods must all be either blunt or pointed, according to the variety, and not mixed either in shape or colour. The pods should not be handled, or they will lose the gloss which gives them such a pleasing appearance directly they are picked. Neither should they be too old. Care is required in setting them out on the dish or stage; a little practice will soon show the most attractive method.

Mildew in peas is generally caused by dryness at the roots, or a cold, dull, and inclement time during the growing stages. The east wind also induces it. Very cold water applied in hot weather will also encourage it. There is no certain remedy.

A TABLE FOR PLANTERS, SHOWING THE NUMBER OF TREES REQUIRED PER IMPERIAL, SCOTTISH, AND IRISH ACRES.

From 1 to 30 feet distance between each Plant.

IMPERIAL ACRE.				SCOTTISH ACRE.				IRISH ACRE.			
Dis- tance.	No.	Dis- tance.	No.	Dis- tance.	No.	Dis- tance.	No.	Dis- tance.	No.	Dis- tance.	No.
1	43560	12	302	1	54760	12	380	1	70560	12	490
1½	19360	12½	270	1½	24338	12½	350	1½	31360	12½	452
2	10890	13	257	2	13690	13	324	2	17040	13	417
2½	6970	13½	239	2½	8761	13½	300	2½	11200	13½	385
3	4840	14	222	3	6084	14	279	3	7840	14	360
3½	3556	14½	207	3½	4470	14½	260	3½	5700	14½	335
4	2722	15	193	4	3422	15	243	4	4410	15	319
4½	2151	15½	181	4½	2704	15½	228	4½	3484	15½	292
5	1742	16	170	5	2190	16	214	5	2822	16	275
5½	1440	16½	164	5½	1810	16½	201	5½	2332	16½	260
6	1210	17	150	6	1521	17	189	6	1960	17	244
6½	1031	17½	142	6½	1206	17½	178	6½	1670	17½	234
7	889	18	134	7	1117	18	169	7	1440	18	217
7½	774	18½	127	7½	973	18½	160	7½	1254	18½	205
8	680	19	120	8	855	19	151	8	1102	19	195
8½	603	19½	114	8½	758	19½	143	8½	976	19½	185
9	537	20	108	9	675	20	137	9	871	20	176
9½	482	22	90	9½	606	22	113	9½	782	22	146
10	435	24	75	10	547	24	95	10	705	24	123
10½	395	26	64	10½	496	26	81	10½	640	26	105
11	360	28	55	11	452	28	70	11	583	28	90
11½	329	30	48	11½	414	30	60	11½	533	30	79

NUMBER OF PLANTS, AT GIVEN DIS- TANCES, CONTAINED IN A SQUARE ROD, POLE OR PERCH.

Ins. asunder.	No. of Plants.
4 by 4	2450
5 " 4	1960
6 " 4	1633
6 " 6	1089
8 " 6	816
8 " 8	612
10 " 8	490
10 " 10	392
12 " 12	272
15 " 10	261

NO. OF PLANTS CONTAINED IN AN ACRE OF LAND.

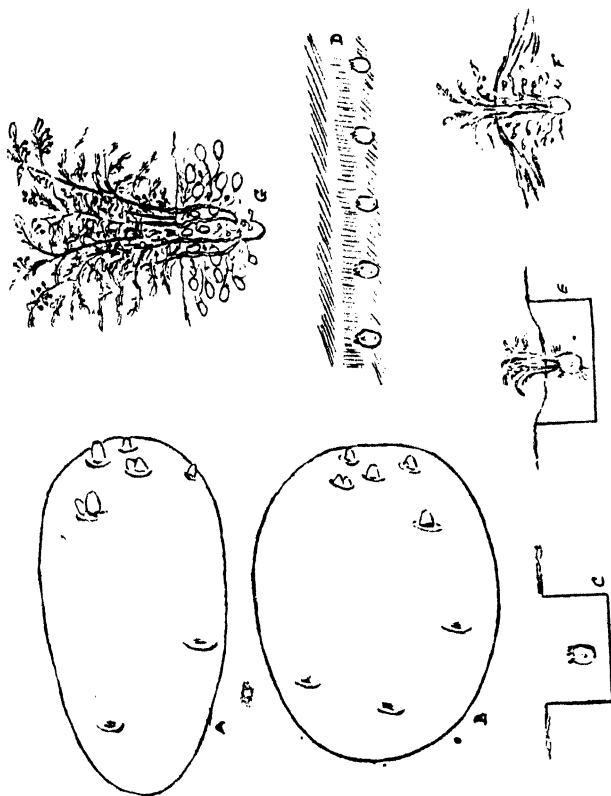
Inches asunder.	No. of plants.	Inches asunder.	No. of plants.
30 by 12	17,424	30 by 30	6,969
30 " 18	11,616	30 " 36	5,808
30 " 24	8,712	30 " 42	4,978

SQUARE OR LAND MEASURE.

	Sq. ft.	Sq. in
	Sq. yards	1 = 144
	Sq. poles.	1 = 9 = 1296
	Sq. roods.	1 = 30¼ = 272¼ = 39204
Sq. acre.	1 = 40 = 1210 = 10890 = 1568160	
1	= 4 = 160 = 4840 = 43560 = 6272640	
1 square mile	= 640 acres.	

LINEAL MEASURE, OR MEASURE OF LENGTH.

	ft.	in.
	yds.	1 = 12
	pl.	1 = 3 = 36
	ch.	1 = 5½ = 16½ = 198
fur.	1 = 4 = 22 = 66 = 792	
Mile	1 = 10 = 40 = 220 = 660 = 7920	
1	= 8 = 80 = 320 = 1760 = 5280 = 63360	
A league	= 3 miles.	A hand = 4 inches.
A fathom	= 6 feet.	



Potato Planting.

- A.—Seed tuber of kidney potato. B.—Seed tuber of oval or round potato.
 C.—Trench showing tuber set in. D.—Showing tubers in row. E.—Showing first earthing up. F.—Final earthing up.
 G.—How the tubers grow. If the variety produces flowers they should be taken off.

HOW TO GROW POTATOES.

There is, perhaps, no vegetable of such essential importance as a food plant in gardens as the potato. Its culture is so extensive and universal that an abundance of supplies are obtainable all through the year, whilst modern methods of serving up to table tend further to increase its estimation. This popularity has induced specialists to create new types, both in shape and colour, possessing vigorous constitution with productiveness and high quality. With all these advantages the amateur gardener is frequently perplexed as to how he shall make his selection from the lengthy lists that come before him. One point should always be clear when purchasing, and that is to state whether white-fleshed or yellow-fleshed varieties are preferred, and if for early consumption or for keeping through the winter. It is maintained by many that the "balls of flour" we are accustomed to in the days of our youth are not now to be obtained. Although such a sweeping assertion can scarcely be substantiated, there is no doubt that too much attention has been given in recent years to the beauty of the tuber as against the scanty consideration devoted to its eating properties, which, after all, is the main thing with the largest number of cultivators. The present custom of peeling away the skin, as compared with the old-fashioned way of steaming or baking potatoes in their jackets, has led to this demand for varieties with eyes on the surface, and the majority of these newer introductions, whilst carrying a very nice appearance on the exhibition board, certainly do not possess the mealy character that is found in some of the older types. All the same, it cannot be denied that the potato is peculiarly subject to influences of soil and season, which act with considerable effect, both in the result of the crop and its cooking qualities.

New soil produces better eating potatoes than worked land in the highest condition, and full of rich organic matter. An ideal soil for this crop is a strong, deep, warm loam, with a dry, porous sub-soil; one that is not sufficiently overfed to cause a luxuriant growth above ground without fertility at the root. Incorrect methods of manuring are frequently the cause of waxy and black-hearted tubers. Again, it is fatal to the potato, as to any other crop, to cultivate

it for years in succession on the same ground and from the same seed, for no variety can flourish under such conditions. The best growers of potatoes for seed purposes change their ground periodically from one county to another for the very object of introducing fresh soil essentials, and thus maintaining vigour in their stocks.

As to varieties, it is difficult to recommend any potato in particular in an article that will come under the notice of cultivators upon soils and in situations of varying character. In most districts there are sorts that have proved themselves good on the soil of the locality, and it is not very difficult to find out what they are, but a note may be made of the fact that during the last few dry summers some very tender varieties have been brought prominently to the front, and are being largely planted. But we may not always get these seasons. Seed tubers range from two to three ounces each, or the size of an egg, and should always be planted whole (see illustration, page 40).

Directly the seed is received, it should be taken out of its covering and laid in single rows in a suitable place, with the eye-end uppermost and well exposed to light and air, but safe from frost. Some strong purple-coloured shoots will protrude from these eyes, and the action of the light renders them robust and well-seasoned. If these come in large numbers, they should all be rubbed off, excepting about two at the point. Some writers recommend only one stem; but having tried all ways, I have come to the conclusion that the largest crop is obtainable from a plant with more than one stem. My sketch of a root from nature shows four stems. When potatoes are procured late in the season this method cannot well be adopted. If the potatoes are kept in a dark place they will throw out weakly white shoots, which struggle to reach the light, and these are likely to get broken off during the process of handling. Their actual presence in this condition is detrimental to the potato, and even when rubbed off its vitality receives a check, and growth is delayed when planted.

The very best rule in preparing the soil for the seed tubers is to throw the surface into sharp ridges three feet in width, and thus leave it to the influence of the winter. Early in March the furrows should be deeply forked up and permitted to lie for a few days, then another light forking to render the surface friable and leave the

ground in a hearty and healthy condition. According to the custom of the district the planting may be done from that time up to the end of April. A shallow trench should be drawn from end to end of the piece of ground sufficiently deep for the tubers to lay 6 inches from the surface-level on light soils, and about 4 inches in heavy soils (see illustration, page 40). These should be placed at intervals of from twelve to eighteen inches, according to variety and vigour of the haulm. For a robust, late variety, the distance in the rows must be quite 18 inches apart, and the rows themselves 3 feet apart, whilst with a small-topped variety it need not exceed half these distances. Both air and sunshine are of the greatest help to this crop, and should not be hindered from penetrating the soil by heavy growths of foliage. One peck of seed potatoes will contain about one hundred tubers, varying either way according to their size.

A rod, pole or perch of ground measures in the square six yards by five yards. Such a piece of ground would take 1 peck of seed potatoes, say 96 tubers in eight rows, planting 12 in a row. The quantity depends upon the size, but this may be taken as an average. Twenty-four bushels is the quantity required per acre of seed sized tubers. If large potatoes are planted more will be needed. Small topped and some early potatoes are planted 12 inches apart in the rows, the later and more robust 18 inches. The spaces between the rows also varies from 24 to 36 inches if green stuff is to be planted between.

The custom with some gardeners of planting with an iron-shod dibber is not to be recommended. It means that the tuber is cast into a hole, the sides and bottom of which are unreasonably hardened, and it takes a long time for the eyes to sprout, and the thread-like roots to lay hold of the soil. Again, it will be noticed, upon inspection, that the eyes of a seed potato are nearly all at one end, and if it is pitched into a hole to fall any way up, it seems quite reasonable to suppose that a large portion may drop the wrong way. Consequently the sprouts must be considerably weakened in forcing their way to the surface, and must ultimately affect the weight of the crop.

Specially-prescribed artificial manures are of value in the growth of potato crops if skilfully used, and if applied they should be

dressed in at the time of planting, and before the trench is covered in. As a rule, the application of raw stable manure at the time the potatoes are being planted is productive of harm in largely producing a rank haulm, and assisting the action of disease, whilst overdoses of chemical stimulants spoil the flavour of the tuber.

The following simple prescription is a safe and suitable one for dusting about the trenches when planting, at the rate of 1 pound per 50 feet. It checks grubs and wireworm, and tends to sweeten an overfed soil: $3\frac{1}{2}$ pounds of slaked lime, 1 pound wood ashes, 1 pound soot, $\frac{1}{2}$ pound salt. To be well mixed together, and applied dry.

It is as well to use the fork between the rows for a few weeks after planting, as it will aerate the soil, and help considerably to bring the sprouts through strong and even. This forking may be continued at intervals until the growth is tall enough for the process of earthing up, upon which operation see separate article under this heading.

It is advisable that rows of potatoes should run from north to south on strong soils, and east to west in dry soils, as they are less likely to get burnt up during the hottest part of the summer. The crop may be considered ripe when the haulms wither, and, when lifted, the skin of the tuber is firm. Choose fine weather for digging them up, and see that every tuber, both large and small, is collected.

Undoubtedly the best place to store potatoes during the winter is in clamps covered with straw and soil. This is the method adopted by farmers, and no potatoes are more mealy and better flavoured than those from the fields, grown where the soil is not so heavily charged with rich ingredients, all of which tend to tighten the texture. In a small garden, however, where space is scarce, it is necessary to adopt some other plan, and they are consequently put into a shed, safe from frost, and used as required. A little lime sprinkled amongst them is very helpful in drying out any excess of moisture.

SALADS ALL THE YEAR ROUND.

What is it that creates such an "exquisite combination" in the Parisian salad bowl? Is it just that suspicion of savory or chervil, the splash of Tarragon vinegar, or that *soupeçon* of the delicious oil of the Provence olive, which gives such a pleasing and satisfying zest, and makes it a repast full of lightness and elegance? Salad plants consist of leaves, roots, and fruits eaten raw or blanched, that is, cultivated in the dark by recognised methods; others grow naturally, wrapping up their hearts with leaves which form compact heads, the inner parts of which are tender and crisp, whilst more included may have to be cooked. Such esculents are the means of supplying the human frame with certain elements helpful to the preservation of health.

On the Continent much attention is given to the cultivation of this class of vegetables, and our markets are chiefly supplied from such sources. In England, the majority of amateurs who conduct their own gardening operations do not indulge in the luxury of salads because of the labour, trouble, and want of knowledge in producing the ingredients. There is no reason whatever why everyone possessing the smallest pretence to be called a gardener should not enjoy the pleasure of a dish of saladings several days a week, at all events during the summer season, with but very trifling expense. A salad is a wholesome addition to more substantial diet, rendering it grateful to the palate, and more's the pity that it should be so rarely obtainable in an average household. We will enumerate a few of the principal amongst salading plants, with some notes on their cultivation.

That most popular salad plant, the lettuce, is divided into two classes—the cos, or upright-growing, and the cabbage, or loose, flat-growing. The seeds of either may be sown in early spring in a bed or along a warm border; in fact, anywhere where the soil is in a nice state of cultivation. The cabbage variety is the quickest to mature, and the thinnings from the bed, when washed, make an

appetising dish. Those that remain will keep on growing, and furnish a good supply of large and succulent plants. Successional sowings will keep up the supply through the summer and autumn, and in very dry weather they should be well watered in the evening. The cos lettuce is sometimes transplanted; care must be taken, in the operation, or they will "bolt to seed." The simplest way is to sow in a line and thin them out. The seed only wants just covering, and the surface lightly patted down. The upright types should be tied up with a piece of matting or raffia (see illustration, page 34), which assists in making the hearts more solid than when left to curl naturally; yet some of the up-to-date types are self-folding. Where slugs abound a good dusting of soot and lime along the sides of the row will be found helpful to the crops. For winter use sow thinly in a box of rich soil in September, transplant three inches apart in other boxes, stand in a greenhouse near the light, water with tepid water, and gather young; in sheltered gardens some may be planted out of doors, using some variety of the brown cos.

Like the lettuce, the leaves of the endive are used in salads; they are very bitter when grown naturally, but when blanched are crisp, nutty, and tender. There are several types, the plain-leaved variety, perhaps, finding greatest favour in France, whilst the mossy curled seems most acceptable to English palates. It is a great pity that this aristocratic vegetable is so rarely seen in ordinary gardens, for it is one of the choicest ingredients in the salad bowl. A first sowing may be made in spring, but the main crop is not taken in hand until the height of summer for producing the plants required for winter use. It is sown in a similar manner to the lettuce, and thinned or transplanted to about 12 inches apart. Endive prefers a rich soil, kept moist in dry weather. As soon as the heads are fully developed (say 6 inches to 12 inches across), a few plants at a time should be covered with a flower-pot sufficiently large to go over the plant, but care must be taken to see that they are perfectly dry before being covered, or they will rot. The best time to perform the operation is on a bright afternoon. It is a further advantage to cover the pot with straw or dry leaves so that the light may be thoroughly excluded. Under such treatment, in a few weeks the foliage will assume that delicate cream colour which makes a salad so inviting. More plants may be treated as required, and if sufficient are grown they will last through the winter.

Chicory is another important addition to the salad-bowl, yet how few people would believe they were eating a plant the name of which is only generally known as an adulterant of coffee! This plant is also sown in spring in the open ground, and thinned out to about a foot apart to grow through the summer, well watered in dry weather. With the change to a colder season, the leaves decay and nearly all drop off. The roots are then lifted, and a few at a time are placed in boxes of rich sandy soil, leaving the crown well above the surface. After a good watering these boxes are stood in a perfectly dark place, and in a few weeks, according to the heat, some nicely blanched leaves will be fit to gather. More roots, kept in a cool place until wanted for bringing along in heat, may be similarly treated. Chicory is a very fine salad, and so easily grown that it should be much more popular. Witloof is a distinct variety of chicory, grown in the suburbs of Brussels, chiefly notable for the largeness of its leaves.

It will surprise many persons to know that the common dandelion of the field is a valuable salad plant. The roots are grown in a similar manner to chicory, and large quantities of the blanched leaves are sold in the London markets. The roots best adapted for culture are those of robust growth found in moist places. Country people eat the leaves green as growing wild, notwithstanding the bitter taste, which is absent in those that are blanched, but they would not suit the palate of a gourmet in this condition.

Beet is a popular garden vegetable, and is most successful in well-cultured and deeply-dug soil. The ideal texture is a deep sandy loam, firm and free from large stones likely to interfere with the growth of the tap root. On thin, badly-cultivated ground the roots produced are forked, and unsightly when lifted. Although we state that the ground should be enriched, it is not advisable to specially feed it directly before sowing, as this also is an inducement for the roots to assume an ugly shape. The manuring should have been done in the autumn. The best season for sowing is the latter end of April for the southern part of the country, and early in May for northern districts. The round variety, which matures earlier than the long-rooted type, should be sown in rows about 1 foot apart and 1 inch deep, whilst the long red variety, which is not ready for use until the end of summer, should be sown in rows

not less than 18 inches apart, and the seedlings thinned out to about 1 foot apart; too thick a sowing is harmful, and the more air each plant receives the quicker it matures. If transplanted it must be done very carefully, because if the tap roots get damaged, the plant will never make a nicely-shaped root. It is very important, when lifting the roots, that they should not be injured. If the skins get broken or the roots damaged, the juice runs out, and when cooked much of the colour is lost, which spoils the appearance of the slices. A good specimen should be a rich crimson or a black blood-red. It is customary to lift the roots early in the autumn that are required for winter use, and store them away in a cool, dry place, mixed with soil or sand; although the flavour of a beet is best retained when the root is left in the ground and covered with a thick layer of straw for protection. Some of our leading exhibitors, in order to obtain symmetrical specimens, resort to what they call the boring process in the cultivation of this root. It is adopted as follows: Two iron bars are brought into use, first a short stout one for making a hole about 18 inches deep, and then a longer and thinner bar is used to extend the depth another foot. Some nicely-prepared loamy compost being at hand is filled into the holes and pressed down, and into the surface of this is carefully planted five or six seeds. When these have grown sufficiently large they are taken out, excepting the strongest one nearest the centre, which is left, and in the rich soil quickly asserts itself (see illustration, page 34). This treatment applies to the long-rooted beets. The round variety does not require such special cultivation.

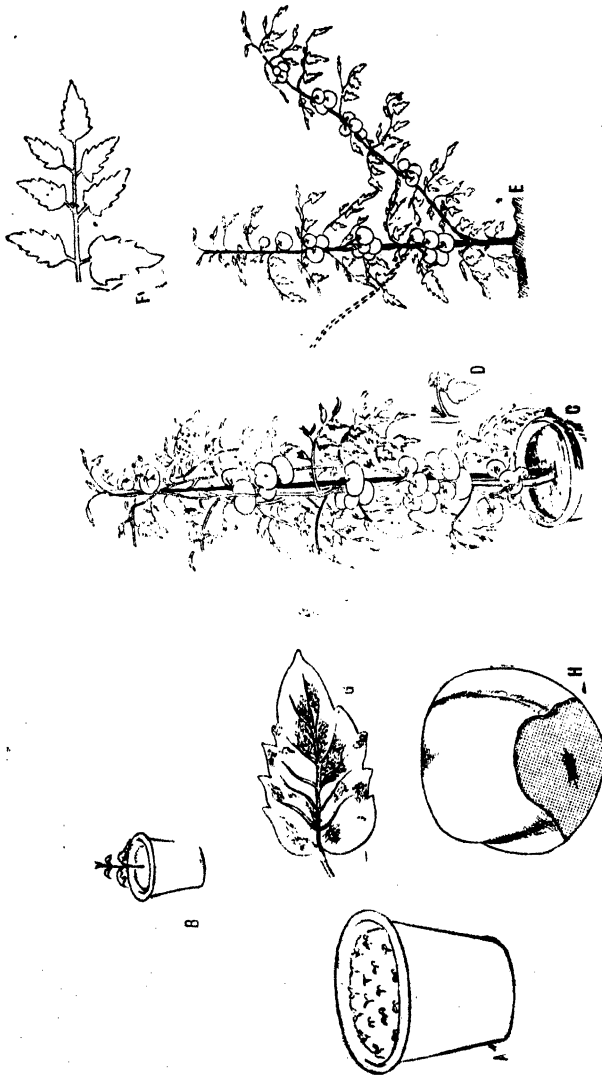
The radish is a popular salad vegetable, and succeeds best when it is grown quickly on a moist rich soil; on hard ground, in a hot dry situation, it becomes coarse and pithy, and is not at all appetising. With the French the radish is quite a proper breakfast dish; and the type they prefer seems to possess a nutty flavour peculiar to itself. The small rooted kinds are the best for this purpose, being very crisp. They form the earliest sowing of the season, which is made in a frame, with nice rich soil (that from an old cucumber bed is suitable). The seed is then scattered thinly, lightly covered, and tightened down with either the back of a spade or something flat, just to ensure a firm hold. No water will be required if the bed is fairly moist until the seed is sprouting. Long and ordinary round radishes can also be sown in frames, but it is more general to put them on a border out of doors and sow, every

three weeks up to September, the chief points being to have the soil fairly rich, to make the bed firm, lightly cover the seed, tighten it down, and give plenty of water if a dry time prevails. Gather them early in the morning, and keep in a cool place in water until wanted later in the day. Where space is limited radishes and lettuces are often sown on a vine border with much success.

Cress has a pleasant, warm, and pungent biting flavour, and can be grown at almost all seasons of the year, in common with its companion, the mustard. It produces small leaves, which are curled in some varieties and plain in others. Its cultivation is of the most simple order. The best plan is to sow it in shallow wood boxes, filled with nice sifted rich soil. This should be pressed down with something flat, leaving a space of about 1 inch between the soil and the top of the box, and well watered. An hour or so afterwards the seed may be sprinkled rather thickly over the surface. I say rather thickly, but this does not mean that they should lay on top of one another. These must then be pressed lightly into the soil, and not buried under a covering of more soil, such as is usually the case. Water again, and for the few days until the seedlings are pushing ahead keep the box covered from nine to four in the daytime with a sheet of paper. This helps to keep the surface moist, which is necessary until growth is well forward (this covering is not necessary from October to April). When the seedlings reach, say, an inch above the level of the top of the box they may be cut off with a sharp knife, and washed before being sent to table. Sow every fortnight through the summer, and every three weeks in winter. A moist heat quickens the growth materially.

We have not mentioned watercress which everyone knows, and need not bother to grow it because of its being available in the shops at all seasons, whilst in many country districts it can be obtained if the trouble is taken to gather it from running streams.

There are several other plants eaten by connoisseurs as saladings, but for some reason or other they do not seem popular—probably because they are almost unknown. They include lamb's lettuce, sorrel, nasturtium leaves, and land cress.



The Tomato in various stages.

A.—Pot of seedlings. B.—Seedling potted off. C.—Plant on single stem in full fruit. D.—A leaf joint showing side shoots which should be pinched out. E.—Plant with two or more branches—a large pointed kind becomes modified in size when grown by this method. F.—When foliage is too luxuriant, it is often necessary to shorten some of the leaves as marked. G.—Leaf suffering from yellow spot. H.—Fruit with black spot.

HOW TO GROW TOMATOES.

It is within the recollection of the writer of these notes when the tomato was looked upon by the majority of people as an insipid and half-poisonous fruit, and, beyond its use in the making of sauces in the largest households, it was scarcely known in ordinary gardens. Things have altered since that time, and we now find the tomato an article of consumption in daily request all the year round. As soon as a taste for the fruit became general, in restaurants and other such places, it was found that the supply of home-grown fruit was not produced in nearly sufficient quantities to satisfy the demand, consequently, its cultivation in sunnier climes, convenient to our shores, became necessary. Thus the fruits that are seen in the fruiterers' shops in large quantities are mostly of foreign growth, and in order to bear long journeys it is necessary to pick them before they are ripe, so that they do not equal in flavour the home-grown product that hangs on the plant until fully coloured. The original types of tomato bear ungainly fruit full of corrugations, and not at all inviting in appearance. Now we have available, through the patient work of expert cultivators, many highly-pleasing forms of perfect symmetry and greatly-improved flavour.

As regards the cultivation of the tomato from an amateur's point of view it is one of those plants that should be taken in hand very early in the year, say during February and early March. The seed should be sown very thinly (not less than half an inch apart) in a pot or seed pan (see illustration, page 50), pressed into the soil, and just covered with more soil. The safest compost to use for this purpose is three parts loamy soil and two parts sand, well mixed; stand on a shelf and cover as directed in chapter on seeds. As soon as the seed germinates the pot should be stood as near as possible to the fullest light, so that the young seedlings may not be drawn up too quickly, but the soil must not get dry.

When they have increased in size to three or four leaves they may be potted off singly, each plant in a small sixty-size pot, in a

compost comprising two parts loam, one part leaf mould, and one part sand. In a month or six weeks' time they again want potting into a forty-eight-size pot, using the same compost. This will probably be during April, and should keep them going until either ready for transferring to beds or boxes in the greenhouse, for training up sticks or trellis, or for making strong and sturdy stuff for planting on a sunny border out of doors the first week in June. It is important to know that the stronger the plants when put out the sooner they will produce fruit. Tomatoes succeed admirably when grown in old wooden boxes in a greenhouse. First of all they should be only half-filled with soil, and, as the plants get established and the roots show themselves on the surface, richer soil may be added during the summer. In such a situation they must be given plenty of light and air, or the plants will get drawn up and the foliage turn yellow, and in this weak state the first bunches of flowers that come are sure to drop off or go blind, that is to say, the lower parts of the plants will be unfruitful.

In a situation that does not admit of extended culture the leader is the only growth usually permitted to go ahead, all the side-shoots being closely nipped out. In some robust-growing varieties which give very large fruits if trained on this plan, two or three of the side-shoots are allowed to develop (see illustration page 50), and under this system the fruits produced are a convenient size for most cooking or dessert purposes, it being generally conceded that two whole fruits look much more inviting on a plate than a portion of one large one. At every few joints a bunch of flowers should show themselves, and it is the practice of some growers as soon as the blooms are fully expanded to touch them carefully with a camel-hair brush for the purpose of distributing the pollen, which has the appearance of yellow dust. The operation should be carried out when the sun is fully out and the air is dry; this plan of fertilising the blooms is practised only under glass, as the wind and insect agencies are supposed to do the work in the open air.

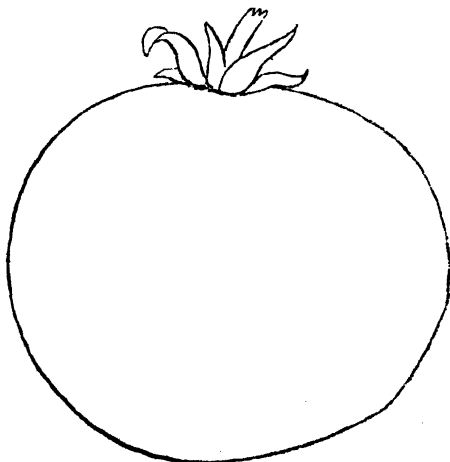
Although the tomato likes plenty of water when thoroughly established, it does not do to keep the house too damp when the blooms are developing, otherwise many of them will not set. If intended to be grown in large pots, the sizes known as 16 and 24 are most suitable; use nice clean healthy loam, filling the pot about three-

fourths of the way up, this leaves a space for adding a layer of rich soil during the summer as the crop advances. Under correct treatment the plants in the greenhouse should continue fruiting until autumn. Those plants that are intended for cultivation out of doors, after being properly hardened off, and before they become root-bound in the pots, should be planted out towards the end of May or early in June, according to the weather. The most generally favoured and selected position is at the foot of a south or west wall or fence which catches the full force of the sun, but they will succeed quite as well in an open south border. In the former position they may be placed about 30 inches apart, and should be supported with sticks, and in the latter position in rows about 3 feet apart and 2 feet between them in the rows. Carefully train the leading shoots, stop the growth beyond the fourth bunch, and keep all side shoots carefully picked out if large fruits are wanted (see what is already stated). Water freely during dry weather, and mulch with good and well-rotted manure as soon as the fruits show signs of swelling.

The plants should bear freely during the months of July, August, and September. Towards the end of the season, when frosts are anticipated, cut all unripe fruits with parts of the stems attached, and these, if hung up, either in the heated house or the kitchen, will ripen, or they could be pickled when picked green. The judicious thinning of the side shoots and shortening of any of the larger leaves that seem in the way of the fruits must be persistently attended to. All the same, the drastic methods in vogue with some growers of almost stripping the plants of their foliage is a mistake; this applies as much to plants growing out of doors as indoors. During the hot summers of recent years the tomato has been a great success out of doors, and if it were the custom of writers to recommend a little less rich feeding for the crop during the younger stages of growth, we should not hear so much about the dreaded diseases that prevail where stimulants are too frequently applied.

Since the tomato has become popular in this country it is found to be liable to the attacks of certain diseases that sometimes absolutely ruin the crop. To mention some of the most common among them. Yellow Spot is a fungoid disease which comes on the underside of the leaves, and is derived from the atmosphere, and is very infectious. Over-feeding, and damp and close houses induce

it. A dry, warm air is the best preventative and check. Black Spot is a fungus which attacks the fruit at the eye, causing a patch of decay as shown in our illustration (see page 50). This is also caused by rapid changes of heat and cold, and dry, warm air is the only means likely to affect a remedy. Wireworm often plays sad havoc with this crop. It is brought in turfy soil, and if it eats into the main stem the plant is doomed. The same disease that affects potatoes often attacks tomato plants out of doors, in dull cheerless seasons, and there seems nothing effective that an amateur can use to get rid of it. Tomatoes should never be grown in the same place out of doors year after year, whilst those intended for under glass should have quite fresh soil, and the house should be whitewashed or otherwise thoroughly cleaned before putting the plants out. Other contributors to these diseases is over-feeding, either by planting in too rich a soil, or watering with strong liquids while the plants are young. I do not advocate stimulants until the plant is carrying a good many swelling fruits. A close moist atmosphere is also detrimental and is the cause of many of the leaf diseases so common. A dry air assisted by plenty of ventilation is one of the best factors towards healthy plants. One of the best crops I ever saw was in a house where the ventilators were left fully open every night during July and August.

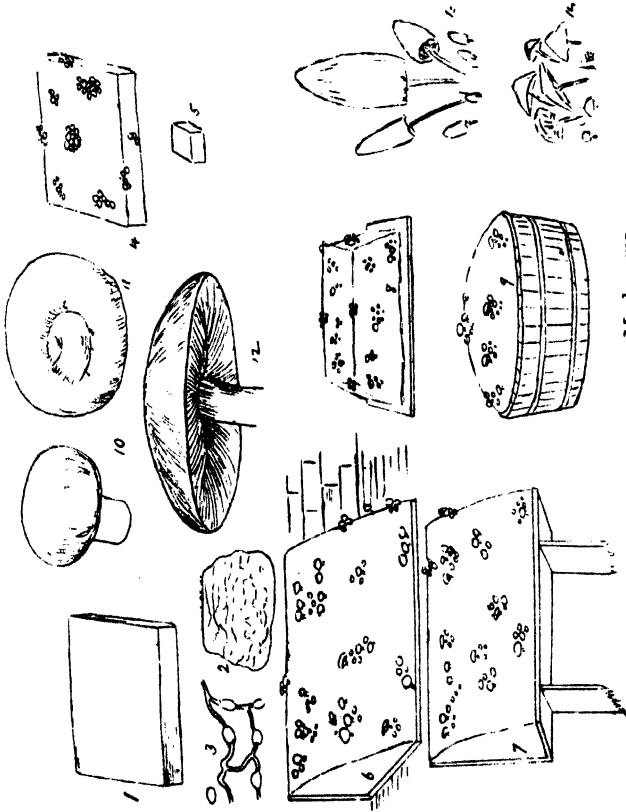


An Exhibition Tomato Fruit, $\frac{3}{4}$ scale

HOW TO GROW VEGETABLE MARROWS.

The marrow is a useful and easily-grown vegetable, the seed being either sown under glass in April and the plants encouraged on until the end of May, when they are planted out, or sown early in May in a prepared heap out of doors, where it is intended the plants are to remain. If a hand-glass is not available, a large pot should be put over the seed from four p.m. until nine a.m. This will keep away a good deal of the night cold. Seedlings raised in this manner do not experience the check that often affects those transplanted from a warm greenhouse or pot, which are very tender when young. The first blossoms that appear are what are known as male flowers, and should not be removed. The female flower follows on, and is distinguishable in being much larger and carrying the semblance of a fruit behind it. It is not advisable to let the fruits rest on the earth; they should have a piece of earthenware under them, similar material to that of which a flower-pot is made. It is better than a piece of slate or glazed tile, which is always very cold. The fruits are best eaten young, although some people like to see them grow as large as possible, so that this point must remain a matter of taste with the cultivator. The largest fruit I ever saw weighed 137 pounds, and was grown by what the raiser termed the "sucking" process. A piece of thick worsted was sewn through the neck with a needle, and the ends laid in a basin of rain water. By this means the water nourished the fruit, and induced it to swell to the enormous size that the weight indicates. The bush or cluster variety is a very useful type for a small garden, as it does not spread, but produces its fruits close to the main growth, whilst the custard marrow is preferred by many to the ordinary cream-coloured and green striped trailing varieties.

The smaller fruiting varieties are generally the best flavoured, and if cooked before they show signs of ripening are very tasty. If a marrow is permitted to ripen the fruit may be kept sound for several months if put into a dry place with a moderate temperature. The vegetable marrow will not stand the slightest frost.



How and where to grow Mushrooms.

1.—Cake of mushroom spawn. 2.—Mycelium in brick. 3.—Spores that produce mushrooms. 4.—Young Mushrooms growing on a cake. 5.—Piece of cake for planting. 6.—Bed made on floor of shed. 7.—Bed Mushrooms growing on a cake. 8.—Bed on floor of cellar. 9.—Growing in a tub. 10.—A button. 11.—A cup. 12.—A broiler. 13 and 14.—Spurious imitations that often appear in a Mushroom bed.

HOW TO GROW MUSHROOMS.

Under natural conditions the mushroom is a wild edible fungus, and appears spontaneously in old pastures and paddocks where horses have been grazed. The season of the year when it is most plentiful is September, after the hot summer has warmed the surface, and genial showers have exerted their influence lower down. With these favourable conditions of heat and moisture a thread-like material is generated, which runs through the earth and throws out in growth above the ground the esculent known as the mushroom. In order that this crop may be available all the year round, artificial means are resorted to, by which the thread-like spores, known scientifically as "mycelium," are preserved in a hardened composition shaped like, and called "bricks of spawn," and pieces of this substance, when planted by correct methods, will produce a plentiful supply at any season. Upon breaking up a brick, the white threads of the spawn will be seen spreading through it; these increase and run over the prepared bed in the form of a web soon after the pieces of brick are put into it. The spawn may be kept alive for a long time if put in a dry place, through which a current of air is constantly passing; but directly it is brought into action in a favourable situation it runs its course under the influence of warmth and moisture (see illustration, page 56).

When an amateur cultivator attempts to grow mushrooms he more often fails than succeeds—maybe not through any fault in the quality of the spawn, but for the reason that he pays too much attention to the preparation and making-up of the bed. There are many plants of a so-called wild nature that resist attempts to grow them under artificial treatment. The mushroom is one which often resents too much attention.

An easy mode of providing a supply of mushrooms in the summer and autumn months is to insert a piece of spawn in the frames or beds devoted to cucumbers and melons. By that time the heat of the fermenting materials has declined to the proper temperature for the spawn to "run" freely, and just when the cucum-

bers have covered the bed with foliage quantities of mushrooms are seen breaking through the soil, and with this protection the supply is continued. The spawn should be inserted rather deeply—say, three or four inches, and some result may be expected within six weeks, and last in bearing for a couple of months. It is not in every case that good crops follow this practice, but the trouble is so slight, and the cost of spawn so trifling, that the experiment is worthy of general adoption. In growing mushrooms in the open air a heap of fresh stable manure is necessary, from which the long straw has been raked out; the residue, short straw and manure, mixed with road grit and leaves if procurable, is turned frequently until it becomes somewhat dry, but not dust dry. It is then placed in beds of any size and depth up to three feet, and should be beaten down firmly.

Let it remain for a few days for the heat which it generates, to subside, as it would not do to plant while at a high temperature. There is a special instrument for gauging the heat called a plunging thermometer. For the present purpose, the hand may be thrust into the bed; this will give a sufficient index as to its state. When it cools down to anything between 70 degrees and 60 degrees it is suitable for the spawn, which is pressed into the compost in pieces as large as a hen's egg, and six inches apart, and in hot weather they should be dipped in water made as warm as new milk before insertion. The whole bed is then covered with three inches of sifted loamy soil, fairly moist, beaten smooth and firm, and sprinkled on the surface with tepid water, which should be repeated for two or three days if a hot time prevails. The beds are then covered with straw, and in wet weather with more protection. If the operation is undertaken at once the bed should be studded with mushrooms before summer is over, and continue production for many weeks, and often months. When the mushrooms grow up long and weakly it is a sign the bed is losing its potency. The manure from the exhausted beds is fine material for spreading and digging into the ground, or for potting purposes later on.

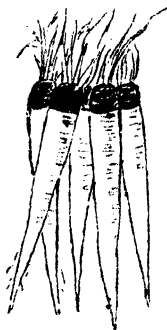
In a large establishment the mushroom is grown in a specially-constructed house, whereby heat and moisture, with an equable temperature, are better secured. Salt sprinkled upon old grass land will often produce them. The writer tried this with good

effect a few years ago in a very warm and moist summer. The salt was scattered about in June, and the crop appeared in September.

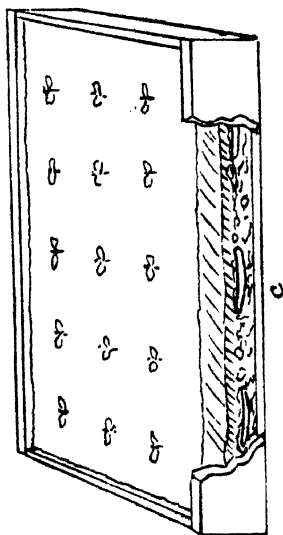
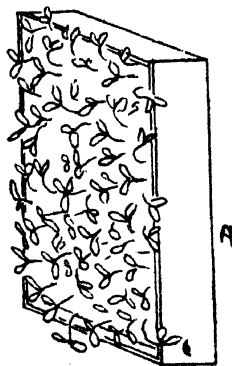
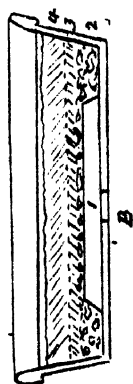
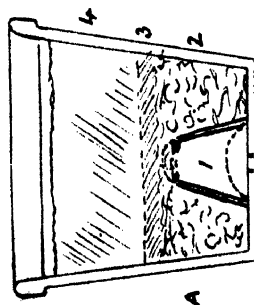
Mushrooms may also be successfully cultivated in boxes and tubs on shelves; indeed, bricks of spawn, laid in a warm cellar and moistened with water, often become studded with growth; but this is rather an extravagant method. A stable or shed is equally applicable. A gardener recently related that in breaking up some bricks in a sheet of paper he threw the waste chippings on a piece of ground where turnips had been sown; at the end of summer he gathered several fine mushrooms, which appeared among the turnips, while he got none on the bed he had specially prepared. Here is a method for growing them in large pots. Fill up to within three inches of the top with cooled horse manure; lay a piece of spawn into it, just covered; on this put two inches of nice loamy soil, neither too wet nor too dry, and made fairly firm. Water and stand on the floor in a shaded part of the greenhouse, and do not be in too great a hurry for results. One brick of mushroom spawn is sufficient to cover two square feet of ground when broken into pieces about as large as a hen's egg. Do not cut the mushrooms when gathering, but carefully twist them off. Beds can be made at any time indoors, spring and summer for preference out of doors. See the various methods shown in our illustration on page 56.



A Head of Seakale.



Salsafy Roots.



How to Crock a Seed Pot, Pan and Box.

A.—Seed pot with small inverted pot inside. 2.—Small crocks, topped with rough material. 3.—Fine sandy soil. 4.—Fine sandy soil.

B.—Seed pan with saucer inside. 2.—Small crocks. 3.—Rough material. 4.—Fine sandy soil.

C.—Box with seedlings correctly transplanted. D.—The same incorrectly filled. See page

SEEDS.

HOW, WHEN, AND WHAT TO BUY.

It is often perplexing to an amateur to know what quantity of seeds he ought to procure for the season's supply. If he leaves it to the jobbing man he may meet with disappointment or he may not, all depending upon the integrity and knowledge of the workman. The best plan is to buy one's own seeds from some reliable source, or, if it is preferred to obtain them locally, they should be in packets bearing the name of a well-known merchant. This ensures that a fresh article is being obtained, and under normal conditions the seeds will grow and produce crops of a good type. It is mistaken economy to buy cheap seeds. They may grow well, and yet the crop be inferior for want of the necessary care in the selection of the stock. In appearance seeds do not tell the purchaser much, as a worthless strain often looks quite as good as that of a superior grade. Then, again, size, appearance, and germinative power have little to do with the actual quality of some seeds. Take, as an example, the original type of the cabbage, which grows in thousands upon the cliffs in front of the Castle at Dover. Here is a plant which is simply a cluster of leaves, yet the seed of this wildling is just as good-looking as the finest garden variety with a solid head, the result of cultivation and breeding over generations of years, and that is why all not versed in the subject are recommended to rely upon some firm whose name and reputation stands well in public favour.

Just the same system is applied to seed-raising and plant-breeding as to live-stock. The important firms have their special strains, which possess a pedigree upon similar lines to a first-class race horse or a prize bullock. There are mongrel seeds in plenty in every direction that have neither character nor quality to recommend them, and enormous quantities of this description are imported into the country every season, and eagerly bought by amateurs and others because of their cheapness. The produce

from such crops is not worth the room occupied in the ground. Here is an illustration in this connection: If a field of cabbage intended to be saved for seed is growing near a crop of, say, curly kale, the seeds saved from the cabbage will produce plants that are neither the one nor the other. A seed merchant who values his customers is well aware of this freak in Nature, and takes care that such a disaster is not likely to happen. As the produce of garden vegetables is intended for human consumption, it must be apparent that the most healthful results are obtained from eating the best.

Here is a list of seeds of ordinary vegetables and potatoes calculated to furnish one year's supply, and suitable for a garden, say, of half an acre in extent, the household consisting of six persons, including the servants. In seeds of good quality such an assortment should cost about two guineas. A garden double the size would not require as much seed again, but might be put down to cost three guineas, whilst for a small garden the cost may be anything from 2s. 6d. upwards.

2 pints broad beans (two kinds), 2 pints dwarf beans (two kinds), 3 quarts peas (three kinds), 1 pint scarlet runners), 2 packets beet (two kinds), 1 packet leek, 2 packets cabbage (two kinds), 1 packet Brussels sprouts, 2 packets broccoli (two kinds), 1 packet cauliflower, 1 packet kale, 1½ ounce onion (three kinds), 3 ounces turnip (three kinds), 1½ ounce carrot (three kinds), 1 packet cucumber (frame), 1 packet melon (frame), 4 ounces spinach (two kinds), 1 ounce parsnip, 1 packet celery, 1 packet endive, 3 ounces radish (two kinds), 1 ounce lettuce (two kinds), 1 ounce parsley, 4 ounces mustard, 2 ounces cress, 1 packet tomato, 1 packet savoy, 1 packet vegetable marrow, 3 bushels potatoes (early, main crop, and late).

The assortment of seeds offered by the best seed merchants for smaller gardens represent a very convenient form of purchase for amateurs who have little or no knowledge on the subject.

HOW TO SOW SEEDS.

February to May are the chief sowing seasons of the whole year, and whilst there should be no unnecessary delay, there is no occasion for undue haste in a late or wet season. The chief

point is to provide a moderately fine soil for the covering of the seeds, which will not only allow warmth and air to penetrate readily into it, but will afford a suitable medium for the delicate roots to push into, and obtain the food necessary, for the nourishment of the young plant. It is on the condition of the soil that depends the even and certain appearance of the plants, their free growth, and ultimate value. The seed-beds and drills should not only be workable, but also moderately damp, for unless the seed absorbs moisture, no germination takes place, and when growth begins and the half-sprouted seed becomes dry, the germ dies. These are proper conditions for the reception of seeds committed to the earth, and we urge the importance of not permitting a favourable opportunity to pass away during the next month or so. In some localities, and in many soils, sowing is proceeded with much earlier than in others, hence the difficulty of fixing a period that shall be strictly followed in any particular district. Upon some tenacious soils it requires a good deal of frost and wind to crumble the surface down to that fineness suitable for sowing, and in a bleak and exposed garden it is sometimes wise to defer operations until the balmy breath of showery April has dispensed its kindly influence, and the conditions are favourable for speedy germination, as the seedlings will then have a chance to grow freely, and avoid the checks which were so hurtful to vegetable life.

Seeds sprout within certain more or less narrow limits of warmth. Peas and beans will grow in a temperature of from 40deg. to 50deg. at the lowest, whilst more tender plants, such as scarlet runners, cucumbers, and vegetable marrows, thrive best in a temperature varying between 70deg. and 80deg., which is only available under glass or out of doors at the height of summer. Seeds committed to the earth below the minimums here stated will sometimes preserve their vitality, but if the soil contains an excess of moisture they are more likely to decay.

Some writers urge amateurs to sow all vegetable seeds in large beds, but this system is not in accordance with our recommendations, and we will explain why we are against such advice. We take it that most of our readers will prefer quality to quantity, and broadcast sowings, while economical, do not give the same high-class produce, as that grown in a drill or line, yet the professional will call this an absurd statement. Take carrots, for instance; if

sown in lines they can be easily thinned out to a required distance apart, the hoe can be kept continuously at work between the rows, and the weeds may be readily taken out, and, if necessary, the surface can be mulched in dry weather. If in a bed, neither the one nor the other can be treated under any method short of expert knowledge, consequently the product suffers both in appearance and quality. Peas, beans, onions, beet, turnips, parsnips, spinach, lettuce, and some other vegetables all come under this head. With the cabbage tribe, which includes brussels sprouts, kale, broccoli, cauliflower, and savoys, it is different; the usual plan is to sow these seeds in a bed, say, one to four yards square, but even then the seeds should be sown in drills with a space between, and from this the plants are transplanted to permanent quarters. The radish is another vegetable that is usually sown in beds, as it requires no thinning or special treatment likely to affect each individual plant. Some seeds, such as tomatoes, celery, cucumbers, melon, and vegetable marrow, are usually sown under glass to hasten their growth, so that they may be strong and sturdy for planting out when the proper season (end of May) arrives, otherwise they would not have time to produce fruits before the best part of the summer is passed.

Young growths of some vegetables, such as broad-beans, will withstand a good deal of frost, whilst others are quickly affected through variableness in the weather; others, again, are subject to the attack of insects the moment they emerge from the seed-shell, turnips and cabbages especially. Beet, parsnip, carrots, and spinach, which take longer to vegetate, will sometimes perish through deep sowing or on a soil which is not sufficiently firm.

Covering the seed to a proper depth is a point scarcely studied as it should be, it varies somewhat according to the size of the seed: Broad-beans may be sown from 3in. to 4in. deep; runner-beans and French beans, 3in. deep; early peas 2in. to 3in. deep; later peas, 3in. to 4in.; radishes, carrots, onions, turnips, beet, parsnips, parsley, tomato, and all the cabbage tribe, less than half an inch deep; celery and lettuce should be just covered, and mustard and cress only pressed into the earth. Sometimes if seeds are sown in a retentive soil a day's hot sunshine will so bake the surface that the tender seedling cannot get through, or a strong

wind will so dry it that every particle of moisture is blown out, and the seed cannot germinate. These are difficulties that are experienced every year in one direction or another.

We now come to the important operation of raising minute seeds in pots or pans (see illustration page 60), and it is with these that amateur cultivators fail, more than with anything else they take in hand. The cause is not far to seek, and the fault lies largely with the books of instruction. In the directions it invariably says that the seeds are to be sown in soil that has been sifted very finely, with the addition of a little sand; such advice is very simple, but we will explain why it is not sound. Finely-sifted loam includes the most minute particles, and when soaked with water it becomes like so much cement; then, again, the white sand added generally contains a large portion of dust partaking more of the character of lime than sand, or in the case of red or yellow sand it is clay. When this is mixed with the fine soil it adds considerably to the consistency of the paste. Into this the seeds are plastered, with but the slightest chance of ever showing signs of regular germination. So far so good, but what is to be done to obviate this? Our advice is that while the soil should be fine, there are degrees of fineness, and we say the actual dust in the soil should be sifted out. As regards the sand, this should be washed before use to get rid of the dusty particles in which it abounds; it can be easily done by putting a few quarts into half a pail of water and stirring it about, emptying out the water, and giving it a second washing; then lay out to dry a day or two before use. Quite one-half of the compost should consist of the sand, this will make it porous, and without air no seed will germinate. Very small seeds should be mixed with a pinch or two of dry sand before leaving the packet, to insure an equal distribution over the surface. Press them lightly in with something flat, like the bottom of a wine-glass. Set two supports on each side of the pot that will stand about half an inch higher, and on this lay a piece of white glass and over it a piece of paper to remain only during the hours of sunshine.

Now as to watering. A freshly-sown pot of small seeds should never be watered at the top for reasons already stated, besides if the operation is not carefully done the seeds are likely to get

washed over the side. We remember not long ago seeing some pots of primula seed that showed no signs of growth, after standing for several weeks, whilst close round each pot we noticed many little seedlings of primula springing up in the coal-ashes, upon which the pots were standing. These had been washed over, and without any care or attention, beyond the fact that they had fallen into the damp porous crevices in the ashes, they sprouted readily. A pot or pan when prepared should be stood in water about half-way up, until the moisture shows signs of having reached the surface, when it may be taken out and stood to drain from night till morning; then the seed may be sown and the receptacle set where it is intended to stay. One often hears the following remark from an amateur: "All the seeds I sow in pots never come to anything, I let them stand for months until they get a green, mossy growth on the top, and then I throw them away." This is due to a succession of errors—a poor class of soil, defective drainage inducing the soil to get sodden and go sour, and want of air are a few of the causes that create the lichenous growth one so often sees on the top of the pots in an amateur's greenhouse.

HELPFUL NOTES ON SOWING AND PLANTING.

If it were not for the depredations of vermin both under and above the ground, a much smaller quantity of seed would suffice than is generally recommended. It is therefore necessary to sow rather thickly, and some of the plants must be thinned out as soon as they have reached a suitable size to be handled. Owing to difference in size there is a certain variation in the numbers that can be got into a certain-sized measure. Take peas for instance. In one pint of the early small rounded seeded varieties there are about 2,000, whilst in a large-seeded marrow-fat, like Telephone, there are only half the quantity; all others range between. A pint of large Windsor broad beans contains 140 beans, whilst a pint of early long pods contains 230. With scarlet runner beans a pint holds 200, Canadian wonders 700, and the small-seeded Newington wonders nearly 1,000. Looking into the smaller seeds such as cabbage, kale, broccoli, Brussels sprouts, cauliflower and turnips, nearly all of which are alike, we find about 7,000 to the ounce, onions 5,000, and carrot with the beard off 8,000, and lettuce 9,000.

AN OUNCE OF SEED OF THE UNDERMENTIONED VEGETABLES IS
SUFFICIENT FOR ROWS OF THE FOLLOWING LENGTH:—

	Feet.		Feet.
Beet	40	Parsnip	150
Carrot	100	Parsley	100
Onion	200	Spinach	80
„ for Pickling	100	Turnip	150

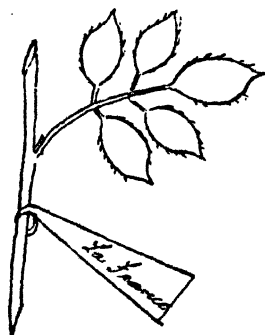
A PINT OF SEED WILL SOW THE FOLLOWING ROWS:—

	Feet.		Feet.
Beans, Broad (large)	60	Beans, French (small)	300
(small)	80	Peas, Early Round	200
French (large)	200	Marrow	150

The Cabbage tribe are usually sown in a seed-bed and transplanted.

Sea-kale roots may be planted in a triangle 1 foot apart, each triangle 3 feet apart if in rows. Rhubarb roots 2 feet 6 inches apart. Asparagus roots see article. Shallots 6 inches apart. Horse-radish 1 foot apart.

See other useful planting and sowing tables, page 39.



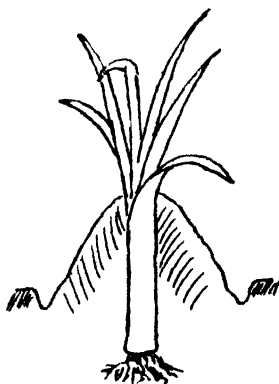
A simple Plant Label made of soft tin. The lettering is written into it with some hard, sharp-pointed instrument. It will remain legible for years.

EARTHING-UP CROPS.

Earthing up is an operation that is undertaken during summer with many vegetable crops. It consists in banking up the soil around the stems, and is done for different purposes. A portion of the surface soil, 2 inches in depth and 4 inches in width, is drawn up on each side of a row of peas soon after they spring up, for the double purpose of steadying the seedlings and sheltering them from rough sweeping winds and bleak and stormy weather. The same may be done with advantage to a crop of beans just coming through, and recently transplanted crops benefit by the process. It is quite the custom to treat potatoes in this manner, but with this crop the work is rather differently done. When the stems are grown up to about 6 inches high the soil between the rows should be drawn up to the plants with a hoe so as to cover quite half the height of the stem, and form a flat ridge each side of the plant, and not forked up close, as is frequently done. The potato plant throws out laterals from the lower part of its stems, and these runners produce many of the tubers, and they have a tendency to grow upwards. The intention in earthing up is to provide a sufficient space for the runners to spread and bear their tubers underground, because not only is the quality of the tuber spoilt if they protrude through the surface, but they also acquire a green colour and an uninviting flavour when cooked. The runner, again, if exposed on the surface, grows away into leafy stems, and the potatoes are not formed at all, for the potato in its young stage is neither more nor less a stem which has acquired a peculiar form by being developed underground. (See illustration page 40.)

Other crops are earthed up for the purpose of blanching the stems to render them crisp and appetising. Celery and leeks are treated in this manner. In the case of celery the earth is levelled up to the stems, commencing from the time when the top of the plants reaches a few inches above surface level, and again when they are a few inches higher (see illustration page 24), the leaves

of each plant being held closely together in one hand while with the other the earth is gradually closed around. This operation is done at intervals, extending through July and August, the later work being done with a spade, so that the bank ultimately forms a steep sloping ridge with a few green leaves at the summit. The leek is similarly treated when they are almost fully grown, and from the nature of the plant the operation is simple and done with a spade at one time. All work of this kind should be undertaken when the soil is fairly dry, as it is more workable and handles with much less trouble than when full of rain. It is the custom in some districts with those who grow these vegetables for exhibition purposes to affix a brown paper collar round each plant, loosely but firmly, to give the blanched portion a clean appearance. To prevent the damp earth from rotting the paper a further collar made of zinc is sometimes placed outside, and it is by the adoption of some such methods that amateur growers are so startled at the fine examples staged by experts.



Leek plant properly earthed up.

HOW TO MAKE A HOTBED.

It is a common piece of advice in gardening books to say "make a hotbed," but no attempt is made to describe how it is to be done, and it is this great deficiency in practical information that renders much of the literature of the day so utterly useless to the amateur or uninitiated gardener.

To define the term hotbed, it may be described as an ordinary garden-frame covered with glass, and placed upon a bed of soil resting upon a solid heap of fermenting stable manure, the heat from which, arising in the form of vapour, warms and moistens the soil within the frame.

Although hot water applied through the agency of iron pipes possesses many advantages in the quick growth of seeds, it will be a long time before the time-honoured hotbed falls out of use, for there is value in the latter that is not available in the former, and that is the dung which has been used in its construction is as serviceable in another direction afterwards as it was before being made into a bed.

If the manure is taken fresh from the stable and made directly into a bed, the heat induced will be violent and short-lived, and seeds or plants put therein are likely to get burnt up: the proper condition can only be obtained by shaking out every forkful of it loosely. Every foot or two of the new heap, as made, should be sprinkled with water, the whole then shaken out again, and that which was previously at the top should now go to the bottom of the new heap, watering every foot of depth with a can that has a rose on the spout. When repeating this operating a third time, with a day or two's interval, the heap may be finally built for the hotbed. Knit the material well together with the fork, for if not made firm the surface becomes uneven afterwards. It should be built quite 4 feet high, and of a size that will leave a clear foot of space all round the outside of the frame that is to go on top; in a few days it will sink quite a foot (see illustration, page 20).

Then place on the glass frame, and inside it lay over the manure 4 inches of nice loamy soil, as this keeps down the rank steam which would come through if not so covered. If the heat is very strong, damp the bed down with water, and, if it continues, raise the "lights" at the top end to disperse the vapour. Another test is to watch the moisture that settles on the glass in globules inside. They will at first be the colour of beer, but as the heat declines will become quite clear. It would then be quite safe to put in the plants.

The seeds or cuttings in pots and pans are put in when the heat gets down below seventy degrees. When the heat declines, as it will in a short time, remove all the dung that projects outside the front of the frame (even if the bed is undermined a trifle it will not matter), and against it pile up fresh dung so as to form a fresh bank. This will revive the heat a good deal, and when it again declines serve the back the same way, and eventually the two sides also. By this means the heat may be kept up a considerable time, because the same process may be repeated two or three times over.

As soon as the whole mass has done its duty as a hotbed a heap of nice soil may be raised in the centre, and melons or cucumbers planted for summer cropping.

This, then, is how a first-class hotbed is made, but often in a small garden some more rough-and-ready method is adopted. With a full understanding of the cardinal principles of so applying the manure as to make it hold the heat of fermentation, it matters little what shape the bed assumes.

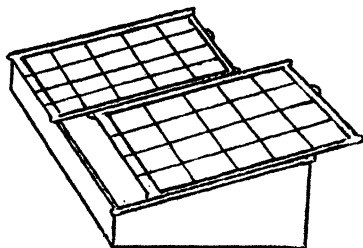
Hotbeds are useful for raising celery, tomato, cauliflower, broccoli, cucumber, melon, vegetable marrow, for starting roots of dahlias, and seeds of many annual flowers, and brings them along much earlier than is possible under ordinary methods on a greenhouse shelf. As soon as the seedlings get well into growth, with plenty of air, and slightly shaded from strong sunshine, they will quickly assume a sturdy habit, enabling them to be potted off early, and be ready for their permanent quarters as soon as the proper season arrives.

A GARDEN FRAME.

A frame is necessary to success in the production of both flowers and vegetables.

The most useful sized frame is a *two-light*, each light measuring 6 feet by 4 feet, the box frame made of 2 inch plank, being 2 feet high at the back and 15 inches high at the front, glazed with 21 oz. glass, size 12 inches by 10 inches. A frame of this size and strength, if painted annually, will last many years.

The frame is of use every day in the year ; its position, however, should be sometimes changed, as some of its occupants want all the available sun, and others want shade. In early spring a heated frame on a hot-bed is required for raising seeds and striking cuttings ; after these are removed cucumbers, melons or tomatoes may be the tenants, and whilst these are in a young state bedding plants may be grown on in the frame ; if the owner has a fancy for forcing he may grow early potatoes, French beans, early carrots, radishes, or almost anything of this character ; if cucumbers are the chosen crop the bed may have some mushroom spawn inserted, and before the cucumbers are finished there will be also a crop of mushrooms. If the frame is not occupied by any of these, and there is a greenhouse, then many of the plants will do better in the frame than in the greenhouse ; or cuttings of this, that or the other are wanted to be taken eight months out of the twelve, and the frame is always the best home for them. In the autumn it may be filled with cuttings in pots or boxes of calceolarias, geraniums, violas, pansies, and many other things that require protection for the winter.



A useful Two-light Frame.

HOW TO MULCH CROPS.

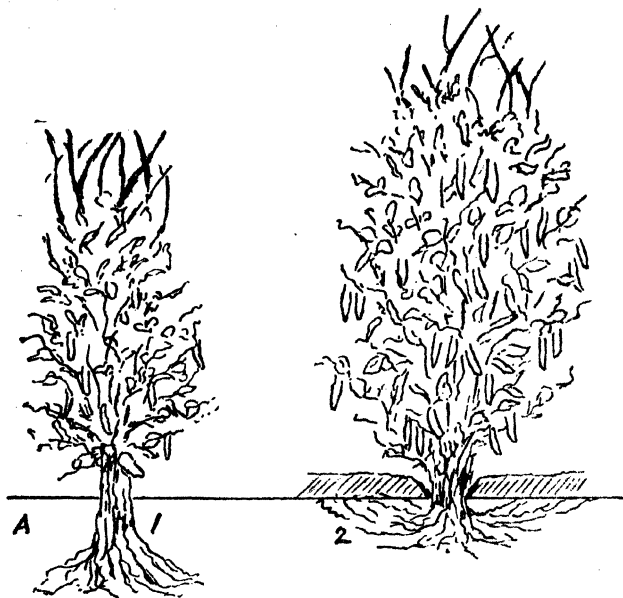
During the summer time, when the power of the sun is great, it is of much assistance to both fruit and flowering trees and smaller growing crops to give them what is known amongst gardeners as a mulch. In soils of a porous description it is found necessary to apply water at intervals to retain life and vigour. Another consideration arises when the ground has not been dug deeply enough in winter. There are degrees in the application of water, and it is not often that the amateur errs on the right side. As a rule, his idea of watering is a few pots spread over a certain area, when, if properly done, the whole quantity should have been applied to one tree. When sprinklings are given to a sun-baked soil, it does not get down to the roots, and evaporation takes place to a greater extent than if no water had been supplied, with the result that the plant or tree is left in a worse condition than before. To compensate for these disadvantages, first of all loosen the earth with a fork, when a good soaking is recommended, and in order to retain its benefits a coating of material is laid over the surface made up of rough soil, old manure, and road grit, or on suitable situations out of the line of sight fresh stable refuse. Grass cuttings from lawns make a useful mulch between the rows of peas. Such coverings hinder the power of the sun from exerting its influences on the parched earth, and the plant or tree receives succour impossible by any other means short of a continuance of heavy rains. Where trees or crops are protected or assisted by some covering of the ground and others left, the difference between them is very great. It need hardly be said that it does not do the same amount of good on all soils, as there are some where the trees and crops do as well without it; but that is only on very exceptional places, where the land is heavy and wet, and even then, after a spell of hot weather, it cracks, and greatly injures the roots, which become strained or exposed. Many depend on watering to keep their crops going, but artificial watering without the aid of mulching to keep it in the earth is not recommended, as no sooner is it given than it is out again. Not only does moisture escape from the soil at a rapid rate, but it is being taken up by the plants, and if there is not a

constant supply in the ground to keep up this perpetual drain, the foliage flags, fruit ceases to swell, and red spider and thrips become rampant.

Though trees have but little fruit to carry, they have their blossom buds to form and perfect, and if they are not assisted in doing this on such soils as we have described, there is not much chance of a crop next year. Before putting the mulching on the soil, the surface should be slightly broken by just digging it up with a fork, which will let in the air freely, and save a hard crust forming. For pyramid trees, such as pears and bush apples, espaliers, and wall fruits carrying heavy crops, it is a good plan to draw a few inches of the earth away around the stem, say for three feet, or more with old trees, as it is not the thick roots that need nourishing, but the thin and active ones, so as to form a basin-like hollow, into which the water may be poured and held till it soaks down to the roots below, as then there is no loss. Although it is well to make the depressions referred to, the hollows so formed should be mulched, and the covering kept on till quite late in the autumn, up to which time several good soakings ought to be given. If the trees have fruit swelling, liquid manure will be a great help, as it is better to give it weak and often than to apply an over-dose.

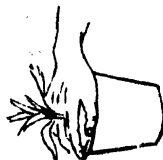
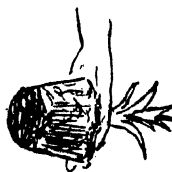
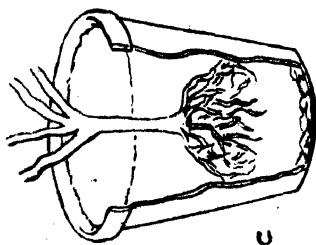
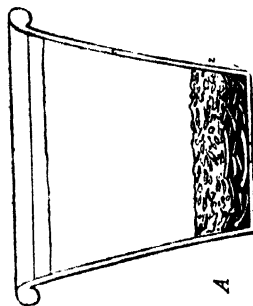
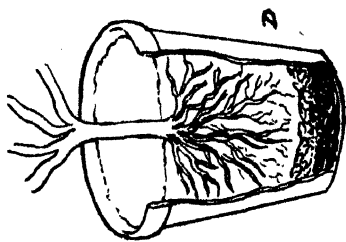
The kind of garden crops that are specially benefited by mulching are peas and runner beans, the former of which can only swell when the soil is moist, as during a dry time the blossoms fall in quantities, but when mulched and watered they stay on and lead to an abundance of pods. Roses, again, thrive remarkably when mulched. Many have great difficulty in keeping bedding plants in bloom, or even to grow; but if they would only mulch them, they would find it an easy matter. For flower-beds, cocoanut fibre refuse or peat moss litter is neat, and a capital non-conductor; but where it cannot be got readily, leaf-soil and road siftings, mixed, answer well, and make a covering which does not look out of place.

See illustration on opposite page.



A. 1.—Peas sown in ordinary drill and not mulched. 2.—Peas mulched in early summer, the roots feeding on the rich warm surface manure.

B. Diseases affecting the cabbage and turnip. 1.—Finger and toe. 2.—Effects of the cabbage gall weevil.—See page 27.



How to crock a pot and pot a plant.

A.—How to crock a pot. 1.—Large crocks with larger piece over hole in centre, flat side downwards. 2.—Rough material between crocks and the finer earth. B.—How to handle a plant for repotting purposes. C.—Incorrect method of potting—roots buried and cramped. D.—A plant properly potted.

HOW TO POT PLANTS.

When a plant is placed to grow in a small earthen vessel, like a garden pot, its condition is exceedingly different from that to which it would be naturally exposed. The roots, instead of having the power of spreading constantly outwards and away from their original starting point, are constrained to go back upon themselves; the supply of nourishment is uncertain, and they are annually subjected to fluctuations of temperature and moisture unknown under natural conditions. For these reasons the operation of potting is one of indispensable necessity, and it is well for the amateur gardener to carry out the work as thoroughly as possible.

The manner in which potting is performed has considerable influence upon the result. The principal requisites are pots of suitable dimensions. The three sizes mostly required are what are called "sixties," measuring about 3in. across the top—the name is used because what is known as a "cast" of this size represents sixty pots. The next is called "forty-eights"—this measures 4in. to 5in. across the top—and the larger size is called "thirty-twos," which measure 6in. across the top, and there are thirty-two in a "cast." There are small and large sixties, which are chiefly used for plants that are potted singly out of seedling pots, such as tomatoes and primulas, or from a box such as rooted geranium cuttings. Most plants bought in nurseries and markets in bloom are in "forty-eights." There are also smaller and larger sizes, all used for special purposes. The proper materials for drainage comprise, first, a piece of flat crock (broken pot) to cover the hole at the bottom; it is not always possible to get it flat, when not so the convex side should be at the bottom, and not, as is usual, uppermost, or worms can easily get in (see illustration page 76). On top of this add six to twelve smaller pieces, or sufficient to cover the bottom piece, which must not be removed or shaken from its place over the hole (in the case of bedding plants that will only be in the same pot for a few weeks, it is only necessary to use one piece); over this place a handful of the roughest portions of the soil, usually that left in the sieve when the compost is prepared,

and minus stones. Then add as much of the soil proper as will allow the plant to stand in the new pot with the top of its attached mass of earth just below the level of the rim.

The amateur will ask: "How am I to get the plant out of its old pot?" The method is as follows: Place the right hand over the pot so that the neck of the plant comes between the fingers (see illustration page 76), turn it upside down and give the edge a tap on the side of the potting-bench or some such place; this should bring it out whole into the flat, open hand without disturbing the roots. Hold the plant upside down in the hand, and take away the drainage that had been previously used; if a mass of roots, disentangle them a little and loosen the sides, and if sufficiently firm also take a little from the top, which sometimes is hard and mossy, and of no benefit in the new pot (see illustration page 76). Next set the plant firmly into the new pot which awaits it on the bench, fill it round about with the fresh soil, pressing it in with the fingers; then give it a knock or two on the bench, and finish the surface off evenly with the new soil, which should be left quite half an inch from the top to admit of proper watering. The soil must be sufficiently dry when used to bear compression without becoming adhesive, and if the plants to be potted are in the greenhouse the soil should lay in the same temperature for some days before use. Such plants as azaleas, with hair-like roots, sometimes become so hard in the middle of the root ball that the water cannot penetrate; in such cases it is best to give them a thorough watering the day before repotting. Free-growing soft-wooded plants, such as fuchsias, etc., will require repotting every spring; but plants like palms or maidenhair ferns will thrive in a 32-size for some years if an annual top dressing is given. This operation is carried out as follows: Take out one or more inches of the soil from the top, and put in some rich, fresh soil, which, when watered, will nourish the plant and create renewed root action. Sometimes the crown of an aged maidenhair fern is set like a mat; in this case, just scratch out as much as possible of the old mossy soil and sprinkle in the new. Plants that have very finely matted roots, such as azaleas and heaths, require to be potted very firmly. It is generally done with a flat-shaped stick, which is well worked all round the pot to assist in consolidating the soil. The surface soil in a pot should never reach the level of the rim, but be finished off not less

than one inch from the top. This admits of sufficient room for the proper application of water.

It is a common fault to overpot plants—that is, put them into too large pots. We do not say that because a plant needs changing every spring it is to go into a much larger pot each time, yet this is the impression conveyed to one's mind who has but little knowledge on the point. It generally induces a wealth of foliage, to the detriment of the flowers.

In potting plants that require cutting or pruning, the two operations should not be performed at the same time. It is best to prune first, and allow the plant to make fresh growth before the potting is performed. Deciduous plants should never be repotted till they have burst well into leaf. Fuchsias, for instance, which have been dried off in winter, should in no case be shaken out of their old soil until it has been moistened, and they have expanded a few leaves, and any pruning required should be done before the roots are disturbed. Evergreen conservatory plants, such as camellias, oranges, and myrtles, have a particular season at which the roots elongate and increase with more rapidity than is usual at other stages of their growth, and, under ordinary circumstances, that season is immediately when they have made their growth in branches and leaves, and it is the most desirable time to repot such as require it into more nourishing soil, just as the roots are extending and ready to take hold of fresh food.

Shifting a plant into a larger pot often becomes necessary when pruning is not called for. When it is desired to increase the size of a plant, it should be changed into a larger pot as soon as the roots have circled themselves among and around the soil in their present pot to an extent that renders it safe to perform the operation without danger of the root-ball falling to pieces. Generally speaking, a sure criterion as to when a plant requires more pot-room and nourishment is when the roots make their appearance through the bottom of the pot. It is, however, much preferable at the near approach of winter to leave plants a little cramped at the roots than to repot them at such a season; under these circumstances the operation should be deferred till early spring. Azaleas

and camellias should not be changed till after the blooming season is passed, and they have made fresh growth; and the exact season for potting such plants must, of course, be determined by the time at which they are forced in, or retarded from, making their annual growth. Another important point is that the pots should be scrupulously clean when used. If they have been previously used, they should always be washed, scrubbed, and thoroughly dried before putting another plant into them.

Here is a list of plants such as are generally found in an amateur's conservatory or greenhouse, giving a suitable compost for the purpose of potting. Plants already established in pots to be treated mostly in spring, and those grown from seeds to be handled when strong enough.

EQUAL PARTS LOAM, PEAT, LEAF-MOULD, AND SAND.

Adiantum (maidenhair fern), aralia, ardisia, asplenium (fern), bouvardia, caladium, canna, clerodendron, cuphea, datura, epiphyllum, erythrina, gardenia, gloxinia, grevillea, habrothamnus, heliotrope, hoya, impatiens, jasminum, lantana, lastrea (fern), magnolia, osmunda (fern), passiflora, pteris (fern), tacsonia, todea (fern), tradescantia.

TWO PARTS LOAM, ONE PART LEAF-MOULD, ONE PART SAND.

Agathæa, agave, aloysia, amaryllis, aristolochia, arum, asparagus, aspidistra, auricula, begonia, bougainvillea, calceolaria, calystegia, campanula, capsicum, celosia, cereus, chamærops (palm), chimonanthus, chrysanthemum, cineraria, citrus, clematis, cianthus, cobæa, coleus, coprosma, cycas (palm), cyclamen, dahlia, davallia (haresfoot fern), echeveria, eucalyptus, fuchsia, funkia, geranium, gossypum, gynerium, humea, hydrangea, kalanchoe, lavatera, mignonette, myrtle, oleander, osmanthus, pancratium, pandanus, pelargonium, phoenix (palm), phormium, pilea, poinsettia, primula; ricinus, roses, salvia, seaforthia (palm), sedum, smilax, solanum, thalictrum, verbena, wigandia. All the common annuals will thrive in this compost.

TWO PARTS PEAT, ONE PART SAND.

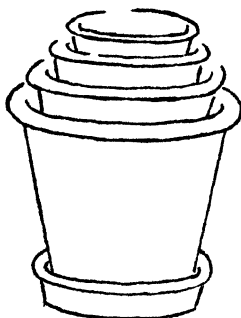
Aphelexis, *azalea*, *boronia*, *cyripedium*; *epacris*, *erica* (heaths), *kalmia*, *lycopodium*, *platycerium*, *polygala*, *rhododendron* (greenhouse), *selaginella*.

All these various descriptions of potting soils can be purchased separately from plant merchants.

SIZES OF ORDINARY FLOWER POTS.

Description and Number to a Cast													
Small.	Small.	Large.	Small.										
72	60	60	54	48	32	24	16	12	8	6	4	1	
Average Inside Measurement.													
2"	2½"	3½"	4"	5"	6½"	7½"	8½"	9½"	11"	12½"	14"	18"	

Special pots and pans are made for orchids and seed-raising.



WATERING PLANTS.

There is no part in the practical treatment of plants which requires more knowledge in the cultivation than the application of water to them. More particularly does this apply to plants in the greenhouse, conservatory, or the window, or on a flower-stand in a room, because the plants that are placed in such positions do not enjoy a free atmosphere, either refreshed with showers or to clean them from dust. Plants kept within doors are wholly dependent upon artificial waterings, and the time and extent of the operation can only be regulated by their nature. Amateurs who cultivate flowers seldom possess this knowledge, and as a natural result their plants are over watered, and are disfigured, and even killed, by too much dosing rather than for the want of it. When plants look sickly, and the leaves lose their healthy colour, and some of them drop off, too much water is often the cause, and the general means of attempting a cure is to give them more.

It would not be possible to detail the time and degree of watering required, but we give a few leading principles upon which amateurs may act with some chance of success. The first thing to be considered is the water itself, which should be rain, pond, or river water. If neither of these can be procured, and hard well or pipe water is resorted to, it should be exposed several days to the air in a broad, flat vessel; this aeration is of the greatest benefit. The next point is, when it should be given to the plants. During winter water is best applied in the morning, so that the dampness arising from it may be carried off during the day. In the summer the evening is the best time to water, but if applied towards evening at the present season the moisture remains so confined in the atmosphere as to injure plants. Much harm is also sustained by delicate plants through being drenched with cold water whilst standing in a temperature several degrees warmer than that of the water administered to them. It chills the roots, and causes much mischief to general health, in fact, the plant sometimes never recovers, and always bears an unsightly appearance.

Water should never be given to plants while exposed to the strongest rays of the summer sun. Nature teaches us that it never rains while the sun shines. There are periods of the year when some plants are quite dormant; in such a condition they require little or no water until such a season when they start into growth; it is then given more freely.

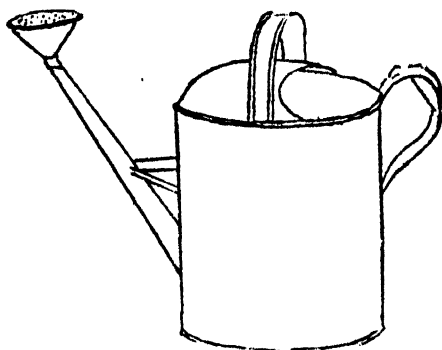
A point which frequently puzzles amateurs who attend to their own plants is that of watering during winter, and without any experience in growing different species and varieties, when to give and when to withhold water is a question of some little difficulty. Many solve it by watering twice a week, the plants being left severely alone on other days. Amateurs should clearly understand that all hard and fast rules are quite destructive to plant life. There are many different conditions which have to be taken into consideration, viz., state of the atmosphere, size of the pot, amount of roots, whether the plant is dormant (*i.e.*, at rest), whether it is producing flower buds, or carries a full expansion of blossom; all these circumstances have to be taken into account, and the answer for each plant cannot be the same. By far the safest plan is to attend to the plants every morning, not for the purpose of giving water, but to ascertain if any are in need of it. Such things as arum lilies, spiræas, and, in fact, all plants that are producing buds or blooms freely at the present season, will require almost daily watering. Plants potted in peat must not on any account be allowed to become too dry, or the fine hair-like roots will soon shrivel and decay. On the other hand, cacti, dormant fuchsias, geraniums in a cool greenhouse, and such plants can scarcely be kept too dry until the end of February. After that time a plentiful supply of water will quickly bring them on into active growth. Another thing, when watering plants, do it thoroughly; small dribbles of water are not the least good; give sufficient to well soak the whole of the soil in the pots. Plants in saucers should not be allowed to stand in water, or serious injury to the roots may follow. If the water is not quickly absorbed it should be thrown out. A properly potted plant, if rapped with the knuckles on the side, will produce a ringing, or hollow sound if dry, but if wet the sound will be a dead, or solid one.

No sooner does the sun give us a few days of its fullest favours than we find the ambitious suburban gardener out with his hose,

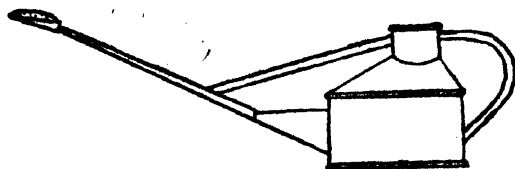
sprinkling seed beds and flower borders with cold pipe water. He notices the soil looks thirsty and naturally supposes it to be so. Now what is the result of this useless energy? The power of the sun may dry up the surface, but its influences cannot yet be felt beyond. Then again the wind has been for some time mainly in the east, and during the last few weeks there have been night frosts of several degrees, all assisting to check vegetation, but these influences in wind and weather matter not to this type of gardener. His mind is made up, and he goes on watering in the full belief that he is assisting Nature to do something that will help him to beat his neighbour. Poor, deluded mortal; if he could but comprehend the damage he is doing he would desist; but it takes something to convince him that he is in the wrong. Later on he wonders why he cannot get his annuals to thrive in hard, baked soil, towards which his early waterings have contributed. Even if they do grôw they are stunted and weedy; this being due again to his persistent efforts in dosing them with hard water at a season when they do not need it. In a few weeks' time, when the evenings are more genial, the lady of the house will come out with her dainty little watering-pot—it generally holds any quantity up to a quart—and with it she flits about, sprinkling the tops of every plant that happens to come in her way. The good soul is freshening up things because they look parched by the great heat. In her innocence this type of gardener is not aware of the great harm she is doing; the plant may be suffering from drought, but the food it needs to bring it again into vigour is wanted down at the root, and not on the surface. By her methods the tender rootlets are drawn upwards in the endeavour to get at the moisture on top; down comes the sun, and not only dries out all water that may have been absorbed by the foliage, but it also draws out the little that fell on the surface, bakes it hard, and so prevents the access of air, and the rootlets which have been seeking it are absolutely burnt up. Thus the last stage of that plant is worse than the first.

These are my ideas in this important matter. Established shrubs or plants in fairly good soil do not want water before June. Those just planted on dry soils and in warm situations may do so, and it should be given in copious supplies during the morning at the present season, and if possible the water should be taken from an open receptacle that has been exposed to the air—it is far preferable to water freshly pumped from a well or drawn from a tap.

Seedlings and annuals in beds and borders should not be sprinkled overhead when cold east winds abound and night frosts are prevalent; they are better kept in a backward state than checked in this manner. Let us take this opportunity to caution those who indulge in lawn sprinklers. In their way these appliances may be very good, if used in a reasonable manner, in the warm summer evenings; but to set them in action for the whole of the day, when all the strength in the grass is needed to withstand the sunshine, is certain ruin to the finer species that are so necessary to make a close and solid turf. The rank growers and the weeds will revel galore, but a lawn should not consist of meadow grasses and daisies.



Watering-Pot, with rose on spout, for general purposes.



Improved Watering-Pot, with a fine spraying rose for seed beds.

A FLOWER GARDEN.

Flower gardening possesses numerous attractions which will always make it a refining pastime. Much might be written upon the elevating tendency of flowers and the number of beautiful plants that are available to the flower gardener of the present day, and the increasing desire for close association with these handsome products of Nature extends from the palace to the humble cottage home. A flower garden should be, as the name implies, a garden for flowers, and the best efforts directed in arranging it so that a good show of blossoms, foliage, and fragrance are available through the larger portion of the year, and not, as is often the case, display nothing but mother earth and a few woody shrubs from November to April.

In an ordinary suburban residence the area devoted to flowers and shrubs embraces the whole of the pleasure garden proper, whereas in an establishment of larger pretensions, the pleasure grounds often extend over many broad acres, and are quite a distinct feature. My intention is to confine these notes to the smaller domain, where the pleasure portion is occupied entirely with beds, borders of flowers, and shrubs, and a well-trimmed lawn, intersected by gravel paths.

In the general formation of a mixed flower garden, the plants, shrubs, and trees of all denominations are admitted too often without the least attention being paid to their distribution as regards heights, colours, and the effects they will ultimately produce in enlivening the surroundings. Another mistake frequently made is in planting too large a variety of border plants without consideration as to the months in which they come into flower, whilst a smaller number selected with judgment may give a succession of blooms from February up to November.

It is a matter of dispute whether the beds in a flower garden should be planted with one species or with a diversity of foliage

and colour. The argument of the advocates of the former system is that in the formation of that assemblage of flowers which may be distinguished by the term "mixed" it is essential that the separate parts should in their appearance constitute a whole. This may, or may not be, a correct view to take; the point would appear to be quite a matter of taste, and should be left to the discretion of the owner of the garden, acting if he thinks proper upon the advice of someone who knows how to tender it. Many gardeners who possess natural capacities for elaborating intricate or even beautiful designs in bedding, naturally feel their abilities are restricted if tied to the creation of such planting effects as shall be of the most simple order.

The management of beds and borders is very easy. First, there are the shrubs which permanently occupy the ground, the evergreen section giving effect in their various gradations of green and gold or silver variegations throughout the year, the deciduous section (*i.e.*, those that drop their leaves annually) giving off their beauty from spring to autumn. Then there are the herbaceous plants, which die down every winter and produce new growth as soon as the influence of the sun has warmed the soil in early spring, these in one form and another flowering from May to October. Next come the bulbous plants, usually put out in the autumn to give effect, if properly arranged, from February to May; these are followed by the bedding plants, with which a garden is decorated in May to produce beauty and effect during the summer months. Under some such a system as we have here advocated the flower garden is made beautiful all the year round.

Many a garden in the suburbs is absolutely ruined through its close proximity to large trees, which in their way are very ornamental and give delightful shade during the summer; but flowers will not thrive under the shelter and drips of trees, neither will they succeed where there is an absence of free circulation of air. Again, the roots of large trees work up into the best soil and rob it of all its virtues, and often completely occupy it with their matted roots. Elm trees are very hurtful in this way, and so is the lime and poplar, whilst the lilac positively delights in absorbing the whole of the nutritive parts of the surrounding earth. Others are similarly injurious, but often do not get suspected from the distance they are away.

In gardens where there are walls near the flower section many beautiful climbing plants can be readily grown, especially on the sides which face the south; but where more than one aspect is at command the season of beauty in any particular flower can be prolonged, or such species and varieties as will produce their blossoms in various positions can be similarly arranged. When some harmonious blending in the colours is adopted the effect is pretty at all seasons.

It has been urged by many that the favourite flowers in old-time gardens have been abandoned by the fashionable world for a new and gaudy coloured race. It is certainly true that many pretty things have been almost driven out by the showy dahlia and pæony, and in the greenhouse by the begonia, primula, gloxinia, cineraria, calceolaria, cyclamen, and other flowers that have in recent years received so much attention at the hands of the skilled plantsman. These latter we cannot well do without, but of the flowers of the open, happily there appears to be a return to things simple, and we hope yet to see the popular hardy annuals take a leading place in the beds of suburban gardens, which their easy culture and general beauty deserve. There can be few gardens where flowers for cutting are not desired for bouquets and vase decoration. For this purpose none are so suitable as these combined with other hardy flowers.

A garden containing a gay mixture of all manner of flowers is to our mind much more interesting than one decorated to a degree of sameness in every direction. The useful geranium in its various hues and shades will never be deposed, either as a bedding plant or as a pot plant in the conservatory, but there is a limit to its usefulness when grown in staring masses.

The continued neatness and order of a flower garden depends upon perseverance in the system of removing irregular growths, and of arresting the points of too robust branches. If this is persisted in before the plants come into blossom they will become bushy in habit, and will not straggle beyond their proper limit.

Unless walks are kept in good order, and clean and free from weeds, a garden can never be seen to advantage. It is not neces-

sary to dwell on the comparative merits of different kinds of gravel, as that most readily obtained is invariably employed. There are various modes of keeping down weeds, of which the use of salt is one, but it is only effective when applied in hot, dry weather; if sprinkled on the gravel during showers, it simply acts as a manure. Arsenical solutions sold by the chemists also kill weeds and moss. All such weed-killers, however, must be used with caution, as live edgings, such as grass and box, will also be destroyed if not protected from the effects of the poisonous dressings, Asphalt walks produce no weeds, and are always smooth, but dull-coloured or black tarred paths are very harsh and unsightly amidst a wealth of floral beauty.

Summerhouses, arbours, fountains, vases for flowers, stands for flower-pots, garden seats, pergolas, and rustic ornaments find place in a garden more or less according to the tastes of the proprietor, and when not over-done they often add to the charm and beauty of the surroundings.

CUT FLOWERS.

Proficiency in arranging cut flowers in vases or glasses is an absolute requirement, and lovely decorations can be fitted up with the commonest garden and wild flowers associated with ferns, grasses, leaves, and many other simple objects, giving a light and elegant display. Too many flowers crowded indiscriminately result in a confused clumsy mass; this is why ladies with nimble fingers and quick fancies are always to be preferred in floral adornment of the room or table.

Flowers should never be cut in intense sunshine, nor kept exposed to the sun and wind, they should be laid loosely in a shallow basket, cut cleanly, and not torn or pulled from the plant. When taken indoors place them in the shade and reduce them to the required length of stalk with a keen knife. They will last longer if sharply cut than when put into water with a jagged edge. Use pure water to set them in, or washed white sand that has been well saturated. Wherever placed, see that they are not exposed to a draught. The best time of the day to gather flowers is the first thing in the morning, before the strength of the sun has dried out the sweet moisture of the dew adhering to the petals.

THE CONSERVATORY AND GREENHOUSE.

In most suburban gardens there is a conservatory attached to the house, to which the best efforts of the gardener gravitate all the year round to show off fine foliage or gay colourings. Indeed, all the flowering plants he has under pot culture find their way to this structure during the seasons in which they are at their best. In addition to these are the climbers and other ornamental exotics planted out as permanent decorations. In smaller places, where no regular gardener is employed, the conservatory is kept gay by some local plant contractor, at a cost which negatives half the charm by which plants grown from a small cutting or tiny seed are reared under the supervision of the owner.

In planting a conservatory picturesque effect is desirable, but a good deal depends upon the size and situation of the building as to the manner in which this operation shall be carried out. Many beautiful plants are indigenous to very shady situations, others thrive under partial shade; these not only hide the naked stems of taller-growing species, but give a more natural appearance to the whole. Climbers and creepers add much to the splendour of a fine conservatory, their rapid growth and profusion of bloom is very useful in screening any disagreeable part of the building, and whilst combining richness in flower and foliage, they may be tastefully trained to hang in careless profusion. It is also in the conservatory that the nearest approach to the native habits of many plants can be developed, and the air perfumed with a subtle fragrance. The best seasons for planting a conservatory range from winter to the middle of summer. Very little fire heat is required in the general management of the plants through winter, and if the temperature is not permitted to drop below 40 deg. no harm will be done. A high temperature occasioned by artificial means during winter often produces much mischief. When it is found necessary to dry up an excess of humidity a good strong heat should be maintained from eleven to two in the day, giving all the air possible during those hours. It is not advisable to choose a frosty day nor one that is muggy, but the happy medium.

In giving directions for watering conservatory plants in winter, it is difficult to lay down a rule upon which to act strictly. Some plants, from their nature and growth and close proximity to air and light, require more of this element than others. In general, the advice is, keep them dry rather than otherwise during the cold months of the year. See chapter on watering plants, page 82.

The greenhouse, as distinguished from the conservatory, is generally filled with stages and shelves, upon which plants in all sorts of conditions are grown in pots, with the idea of transferring them to the conservatory when at their best.

It is during the winter that new glasshouses are generally erected, as it is then more easy to disturb the ground than when full of growth and flowers. Small structures may be put up at any season. Although success in cultivation depends more upon management than upon any style of building, it must be admitted that little assistance is given by many of the architects and builders of suburban villas; any corner or aspect that suits their plans is deemed good enough for plants. Again, there is a growing tendency to put in elaborate panellings of coloured glass, all of which are most hurtful to vegetation. When about to erect a glass structure, it is best to employ a firm who makes the business a speciality, and understands the following points: Drainage, ventilation, the supply of air without excessive draught, and the proper setting of the heating apparatus, otherwise it is likely to be a source of perpetual trouble.

Writers upon all subjects connected with plant life always insist upon a healthy growth throughout the different stages of culture, but they do not often go into detail as to the manner in which to ensure that a plant shall always remain in this happy condition. The soundness of the advice cannot be disputed, but the cultivator is left to find out as best he can what is to be done and how he is to set about doing it, and he remains as much mystified as though nothing had been said.

When a general assortment of plants is mixed together in one house the surroundings are almost certain to be unsuitable to a few of them. This may be accounted for by their being placed in a corner where there is little air, standing under a drip, in a draught,

or in a position to which the full force of daylight does not extend. Then, again, some plants thrive best when standing on a cool, damp bottom, made of sifted cinders, coal dust, coarse sand, or shingle, in preference to a dry wooden stage, which with many plants tends to induce all sorts of vermin. Camellias do not succeed nicely in a dry sunny greenhouse, but prefer one with a northern aspect, where the glossy foliage becomes rich in colour and plentiful. Azaleas on a dry staging are sure to become alive with thrips, causing the leaves to go rusty and drop off. Dracenas and aralias are certain to go "leggy" if kept in such a situation. These are a few of the causes that render plants unhealthy, and as a consequence become affected with fungoid growths, covered with vermin, and leafless. The first point to study is cleanliness, which is best brought about by giving plenty of air almost day and night in summer, with a corresponding quantity of water every evening after hot days, which is quickly absorbed into the tissues of the leaves. It is not intended to convey the belief that every individual plant must be watered, but only those requiring it. The walls and floors also need "damping down," as gardeners call it, with a syringe, if possible, for the walls, and a water-pot for the floor.

Clean pots are also desiderata—a flower-pot when covered with a green lichenous growth is in itself sufficient to spread disease, and an unhealthy atmosphere. It is not difficult to wash a pot while the plant is in it if it is placed upon a bench and a hard scrubbing brush used; but by far the best plan is to transfer the plant bodily to a clean pot of the same size. When the writer was learning his work as a gardener, years ago, it was the delight of the boys of the establishment to collect up the dirty pots and get them into large tubs of water. The operation of washing them was considered a great luxury as overtime work, and the remuneration was 2d. per cast, that is to say, of the 48 size pot this number had to be washed for the handsome return stated, and emulation was great as to who could wash most. The pots were then put out to dry, and in a day or two stacked away one inside the other, all included in the 2d. per cast. The writer used to prefer the pots made of the clay that came out of the Copenhagen tunnel, near King's Cross, as they had such a smooth surface. By a lengthy soaking beforehand quite half the work is done. This experience is merely referred to so that amateurs may see for themselves how easy it is to have clean pots.

Sponging plants with soft soapy water, or one of the patent liquid applications, diluted according to the directions, is the best method for keeping the leaves of such as camellias clean, whilst small azaleas should be dipped down to the neck of the plant, and large ones laid on their sides on the ground and severely syringed.

The fumigation of greenhouses with tobacco smoke to get rid of such pests as green fly is all very well in places that are not likely to be frequented with visitors, but the offensive smell that hangs about for days after is most distasteful if the house is near the residence. Some of the newer patent materials seem less obnoxious in this respect, and should be used in preference. They are sold by the nurserymen with full instructions attached.

Many of the hard-wooded plants that are objects of the greatest beauty in decorating the conservatory during the spring and early summer, when losing their flowers are too often relegated to some back corner, and for the time-being quite neglected. When it is borne in mind that these plants will come again into service next winter and spring, they are deserving of more consideration, and their better treatment should be undertaken in the following manner. Cut or pluck out all faded flower spikes and seed pods, top dress the soil by taking out an inch or two of the surface, filling in some fresh compost; in the case of plants that have already been more than one year in the pots, repot entirely. It will be as well to keep them in a cool greenhouse for a few weeks—one facing the north or east is preferable—they will then throw out new growths. During June, when standing out for the summer to harden, some little thought should be given to the position, as such plants often suffer much injury from the sun's rays. When so exposed without the benefit of shelter of any kind, the soil is apt to become so thoroughly dried that it is with difficulty moistened again, hence the scorched and stunted growth sometimes seen in the summer season. The injury mostly arises from exposing the pot in which it is growing; the sun's rays acting upon the pot, in conjunction with the evaporation constantly going on soon deprives the soil of its moisture, and as all the tender roots are usually in close contact with the inner sides of the pot, their destruction is inevitable. It is no uncommon thing to see the soil so much dried as to shrink quite away from the pot.

Under such circumstances the water which is supplied sinks down as fast as it is poured in; and fails to moisten the interior of the ball of soil. Then, again, the necessity for constant watering caused by this exposure is an evident waste of time.

When such plants are turned out of doors their roots ought to be sheltered from the adverse influences alluded to, and one of the simplest methods is to plunge the pots into the ground, or in beds of cocoanut fibre, ashes, or anything in this way; and if the situation is one in which they will escape the intense heat of the brightest hours of the day, so much the better. They will, of course, require a certain amount of water at intervals, according to the weather, but escape the harm we have referred to, and will be all the healthier when it comes to their turn to be taken under glass again in the autumn.



A useful Decorative Palm. *Cocos Weddelliana*,

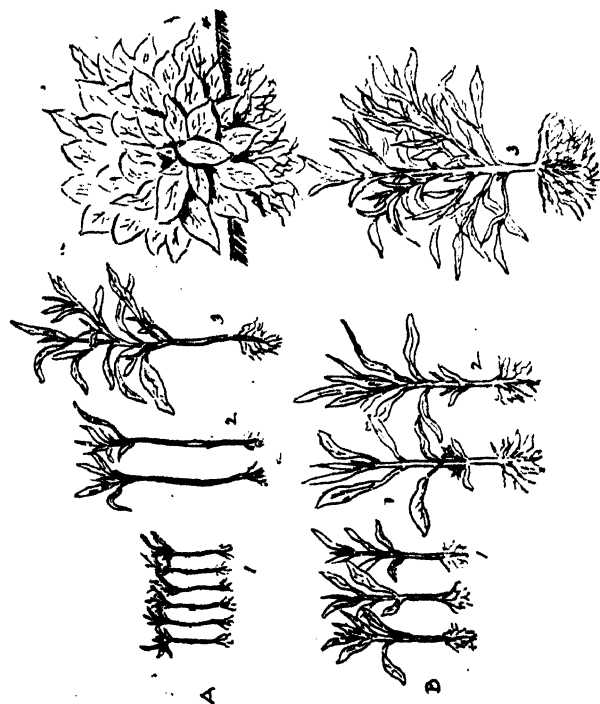
THE PRIMULA.

One of the most attractive flowers for winter and spring decoration of conservatories is the beautiful Chinese primula. We call it after this Eastern country because it had its origin there. The flowers of the parent are about the size of a sixpence and of a dirty white, whilst a good modern type is as large as a five-shilling piece. Its manner of flowering is particularly elegant, for out of a single umbel or head of flowers rises a distinct scape or stalk, sometimes supporting a second umbel; it remains in bloom during the greater part of the summer, but is in its greatest beauty in winter and spring. The primula is grown from seeds sown from April to July in a seed pan and potted from there singly into small pots, repotted at end of summer, into what is called 48-size pots, for blooming from November until the end of spring. They will thrive under ordinary greenhouse treatment, but prefer plenty of room on a cinder or earth foundation rather than on a wooden stage during the younger days of their growth.

At no stage should the primula be over-potted or planted in an ill-drained, sodden, and sour soil. The best compost is one made up of well-decayed leaf-mould and rich fibrous, turfy loam in equal parts, and a good sprinkling of rough sand to keep the soil open. This does well for the plants in a young state; when shifted later into their flowering pots some decomposed cow or stable manure, to the extent of about one-sixth of the soil, and a slight sprinkling of guano may be added with advantage. It is of the utmost importance to drain the pots well at all stages of growth.

In potting, the plants should be placed rather deep in the soil, but not heaping it up in the centre, or the plant will rot at the neck. The soil should be pressed moderately firm about the roots. Thorough drainage is absolutely necessary, and it is one of the first conditions of success. In all stages of growth of the primula, and especially in the later ones, no check should be permitted to interfere with the plants, or their development will become arrested and the heads of bloom imperfect.

The double varieties of the Chinese primrose are now somewhat numerous. The double forms lack the vigorous constitution of the single types, and require during the winter and spring months to be kept in a rather high temperature. The double varieties, when full of bloom, are so useful to cut from, and so lasting, that they will repay extra care. They should have richer soil than the single varieties, not be over-potted, and the pots thoroughly well drained.

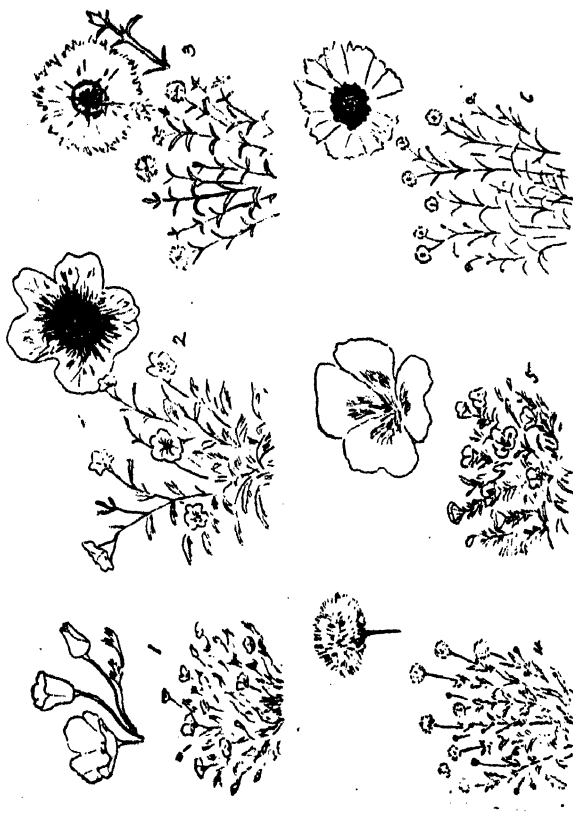


A Lesson in Raising Annuals.

- A.—Starved and drawn up seedlings. 2 and 3.—They get more lanky and sickly-looking as they get older.
- B.—Healthy seedlings. 2 and 3.—Strong plants. 4.—An established plant, the foliage entirely hiding its stem.

A GARDEN OF ANNUALS.

Of all summer flowers, annuals are perhaps the most interesting, and the easiness of their culture renders them eminently suitable for amateurs. It is astonishing how much effect may be displayed in a garden, however small, by a tasteful arrangement of annual flowers. All that is required is a knowledge of the colours, forms, and habits of growths of the different kinds. Quite a new world of floral beauty is revealed when the proper types are grown with reasonable attention. Watering, transplanting, training, and cutting off the dead flowers are all healthy occupations, besides the advantage of gentle exercise in the open air. By the term annual, when applied to plants, is understood such as bloom, ripen their seeds, and die or finish their existence the same season as that in which they are sown. In this country they are divided into two classes, namely, half-hardy and hardy. The first requires to be sown under glass, and to be protected until the season is sufficiently warm during May and June to plant them out. The culture of annuals has two great advantages over the growth of all the other flowers; in the first place, it is attended with much less expense than any other description of flower culture, and, in the second, all the enjoyment is obtained within the compass of six or eight months. The seeds cost a mere trifle; nothing but pleasure attends the thinning out and arranging of the plants for effect. Such a vast number and variety of annuals now being known, the whole of which it would be impossible to introduce into the garden, however extensive, renders necessary a judicious selection of the best kinds. It is a common error to suppose that all that is necessary to make a showy flower garden is to sow the ground with a great many different kinds. A few of the most brilliant and ornamental, arranged so as to harmonise in their colours and habits of growth, cultivated with care, and when necessary trained into regular and compact shapes, will produce more effect than a large number sown injudiciously, and permitted to grow on in a crowded mass (see illustration opposite). They are equally pretty associated with the hardy perennials of the borders, or the more tender of the bedding plants. The object at which to aim in the



Six beautiful Annuals.

- 1.—Pink Eschscholtzia.
 2.—Salpiglossis.
 3.—Large-flowered Dianthus.
 4.—Centaurea Margarita.
 5.—Satin flowered Godetia.
 6.—Golden Callopsis.

arrangement is not so much the production of a grand display at a given date, as the maintenance of an attractive condition over the longest possible period.

Hardy annuals, as already stated, are such as may be sown in the open ground as soon as spring weather becomes settled; and the surface soil a little dried by the winds and warmed by the rays of the sun; this generally happens from the beginning to the end of April. If the spring is wet and cold the operation of sowing may be delayed a week or so longer. The seeds should be sown either in lines, circles, or patches, according to the positions available, and as the majority are generally very small, they should only just be covered with soil, and not sown deeply. The surface may then be flattened gently, and under the influence of April showers the little seedlings, which are very delicate, will soon develop. Some of the common types may be sown at the end of summer out of doors. If these are potted up singly before winter, and kept in a cool frame, it is surprising what large plants they will make the following spring, and will bloom much earlier than the spring sown ones.

Sweet peas and lupins, having rather large seeds, should be planted about 1 inch deep, and balsams about half an inch deep. Some seeds will bear transplanting; others do not thrive so well when moved. Such beautiful things as poppies, larkspur, mignonne, eschscholtzia, and portulaca always seem to succeed better when not transplanted. A good free loamy soil that has not been over-manured suits annuals; if too rich it induces a wealth of foliage in place of a good mass of blossoms; they all like plenty of moisture, sunshine, and pure air.

A very common mistake of inexperienced gardeners is to allow the plants to stand too thickly. At least half of the owners of gardens throughout the country really do not know what some of the best annuals are like, or of what they are capable, simply because they have never seen them grown in a natural and proper manner. Usually they are so crowded together that they have not breathing space, and then people term them "short blooming," "weedy," and so on. Ten times the number of annuals are sown as would suffice to cover the required space, and instead of any-

thing being gained, the plants actually kill each other. Of course, it is necessary to sow a larger number of seeds than of plants that are actually wanted, to allow for attacks of insects, accidents, etc., but there is a vast difference between that and having a hundred plants where a couple of dozen at most would be enough. Too frequently are seen such beautiful things as helichrysums, annual chrysanthemums, cornflowers, and phlox standing with not an inch between, when the distance of a foot would hardly give them space to develop properly. The consequence is weak, puny stems, and a few poor, small and flimsy blossoms that are soon over, and are scarcely worth having while they last. A single plant of the common helichrysum, godetia, or cornflower, if well grown in deep and fairly good ground, and allowed to develop itself freely in all directions, will form a shapely bush, with stout stems, nearly two feet through, and will produce hundreds of fine large blooms of great substance in the course of a long season, oftentimes extending over some months. This is the way to see annuals at their best, and such flowers are not only of much finer and richer colours, but when cut they will stand longer and better than those that are grown in crowds. (See illustration page 96).

Many annuals are suited for pot-culture, and with correct treatment form objects of great beauty when in season. Some of the most effective are the godetias, lobelia, rhodanthe, schizanthus, coxcomb, red and gold feathery celosia, balsam, mimulus, amaranthus, stock, aster, and the new blue annual delphinium. They require to be grown in a cool house in a light compost of loam and sand; the seeds should be sown very thinly, so that those that remain to develop may have plenty of room. (See article on seeds, page 62.)

To keep annuals in bloom for the longest possible time, all seeds should be removed as fast as they are formed in the flower-heads. In some cases this is difficult, but where the seed-pods are large enough to handle, their removal should be followed up systematically. Many annuals that only last in bloom a few weeks if permitted to retain their seeds, will last the summer out if these are removed as soon as formed, and that means simply cutting off the faded flowers say, twice a week.

SELECT LIST OF ANNUALS AND BIENNIALS.

MINIATURE GROWING.

Calandrinia umbellata, *ionopsidium*, *mesembryanthemum*, *portulaca*, *santivitalia*, *sedum*, *leptosiphon*, *saponaria*.

PLANTS UNDER SIX INCHES.

Clintonia pulchella, cornflower (miniature), *limnanthes*, *lobelia*, *nemophila*, *phlox Drummondii* compacta, rock cistus, *saponaria*, *silene compacta*, sweet alyssum, sweet pea (dwarf), *tagetes signata pumila*, virginian stock.

PLANTS FROM SIX TO TEN INCHES.

Ageratum, *antirrhinum* (little gem), aster (dwarf bouquet), aster (*Victoria*), *bartonia aurea*, *calendula poncei*, *calliopsis nana*, candytuft, *collinsia bicolor*, *convolvulus minor*, daisy (Swan River), *dianthus*, *erysimum*, *eutoca viscida*, *eschscholtzia*, *gilia tricolor*, Indian pink, *jacobaea*, larkspur, *linaria*, *linum* (scarlet), *lupinus nanus*, marigold (dwarf striped), *mignonette*, *nasturtium* (*Empress of India*), *oxyura*, *phacelia*, *rhodanthe*, stock (ten-week), *tagetes*, *viscaria cardinalis*, *whitlavia grandiflora*, *zinnia*.

PLANTS FROM ONE TO TWO FEET.

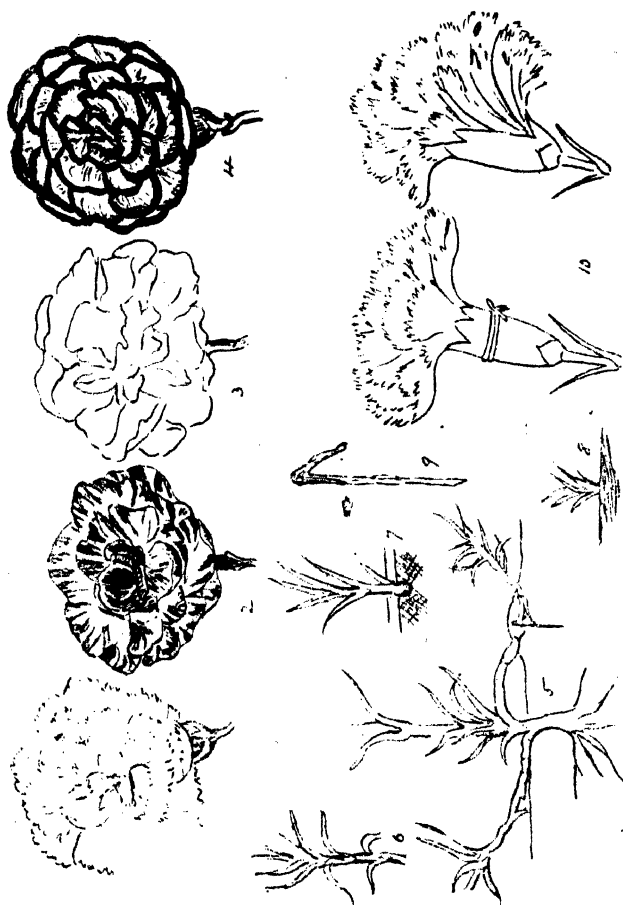
Antirrhinum, *amaranthus*, balsam, *bidens atrosanguinea*, *calendula*, *calliopsis*, *celosia*, *chrysanthemum* (annual), *clarkia elegans*, *clarkia integrifolia*, cornflower, *godetia*, *gypsophila paniculata*, *hibiscus*, *helichrysum*, love-in-a-mist, *lupinus subcarnosus*, malope, *mimulus*, *nigella*, *petunia*, pink mallow, poppy, *salpiglossis*, scabious, *schizanthus*, sweet sultan, *zinnia pumila*.

CREEPERS AND CLIMBERS.

Convolvulus major, *thunbergia*, variegated hop, *mina lobata*, canary creeper, *cobaea scandens*, tall *nasturtium*, sweet pea.

ANNUALS WITH EVERLASTING FLOWERS.

Acroclinium, *ammobium*, *helichrysum*, *helipterum*, *morna*, *rhodanthe*, *waltzia*, *Xeranthemum*.



1.—Pink. 2.—Flake carnation. 3.—Self carnation. 4.—Picotee. 5.—How to prepare a layer.
6.—Cutting. 7 and 8.—A cutting in the soil. 9.—Wood peg for layering (see also No. 5).
10.—Tying calyx to prevent it bursting.

ALL ABOUT CARNATIONS AND PICOTEES.

Many of the most beautiful garden flowers possess a history which carries them back to a common origin. In connecting the pink and carnation with bygone days the following paragraph is peculiar reading, as bricks and mortar have for long covered the rural walk referred to: "There is a wild creeping pink which groweth in our pastures neere about London, especially in the great field next to Deptford, by the pathside as you go from Redcliffe to Greenwich." Such is the description and habitat of one of the original types from which our garden pink is derived, as left on record by the great herbalist Gerard, who had a noted garden, and grew both pinks and carnations in the sixteenth century near where Holborn-circus now stands, whilst some of the best of the old-time improvements raised more than a hundred years ago in Camberwell, Hoxton, and Lewisham are still found in cottage gardens. With respect to the clove carnation, we learn from Chaucer "That it was cultivated in this country as early as the reign of Edward III., and used to give a spicy flavour to ales and wines, and called sops-in-wine." Here, then, we have a scrap of the earliest information regarding one of the most beautiful and popular of our garden flowers, and there is nothing more interesting in the history of modern floriculture than the advance made in the size, formation, and richness of colour in the genera popularly known under the name of carnations, picotees, and pinks; and it would be difficult to find a well-regulated garden without them, either as pot plants decorating the conservatory or as border plants in the open ground.

Some carnations possess a spicy odour possessed by no other garden flower, yet many of the most advanced modern types are quite devoid of scent. In the eagerness of the expert grower to produce a fine flower, the pleasing attraction of fragrance seems to be entirely lost. In form they are perfect, and in the disposition of their colourings they are perhaps more showy than any other hardy plant, but a handsome flower without perfume loses half its

charms. It is difficult to say which of the family is the most beautiful—the carnation, with its pure white ground flaked and bizzarred with numerous bands and splashes of colour; the picotee, with its narrow margin of scarlet or purple; or the garden pink, with its prettily fimbriated edges, and smelling so sweetly.

The carnation is propagated by cuttings, layers, and seeds. Layering is a popular way of securing young plants, and in light soils it is only necessary to loosen the surface round the parent plant before putting down the layers, but in earth of a closer texture a mixture of sand and leaf mould laid in about 2 inches deep, will be found beneficial (see illustration page 102). Layering is best done from July to September, after the best blooms are over, choosing healthy growths, called by experts “grass,” which show no appearance of running to flower. The manipulation may be simplified by taking a few of the leaves away near the base, cutting half though the stem of the layer just at the bottom of a convenient joint in a slanting manner. The tongue formed is inserted in the soil, and the whole stem fastened firmly with a hooked wooden peg, made out of the thin parts of a pea stick, which is far better than metal. Nothing more is required, unless the weather be dry, when an occasional watering is advisable. In the course of five or six weeks the layers should be rooted, and may then be detached from the parent. They will now have attained the position of plants, and may be left for a week or two to form good roots, when they are transferred to their flowering quarters, and any required for pot culture or spring planting may be potted up and stood in frames, being kept close for a few days, and afterwards given plenty of air. The soil suitable at this stage is three-fourths hazel loam and one-fourth coarse sand. The pots should be what are called large “sixties,” and be stood upon a cool, hard bottom. The protection afforded by the frame is not so much against cold, but soaking rains which the young plants may not be able to withstand. In March, or as soon as the weather is favourable, they may be planted out to where they are intended to bloom, in good rich loam. As soon as they start to grow all the attention necessary is that of tying up and watching for vermin. They may be expected to bloom during July, and will soon after be ready for the same treatment of layering as already referred to.

If extra large blooms are desired the buds should be thinned out, two buds being taken away wherever three come together.

Those making the first attempt and requiring only flowers for the decoration of the garden will do well to try their skill with seedlings, sowing a good strain. Carnations are easily raised from seed, and well-grown plants afford large quantities of single and double flowers for cutting. A good strain should produce about seventy per cent. double flowers. Seed should be sown in March in pans of sandy soil, covered lightly, and placed in a temperature of about 60 deg. Keep the soil uniformly moist, and admit more light and air directly the seedlings appear. Then place the pans in a cold frame, and when the seed leaves are fully developed prick the plants out into boxes or a frame 3 inches apart, and about August they will be large enough to put out in beds about a foot apart, where they can remain through the winter. If intended for exhibition, named varieties should be obtained and the plants grown on in pots, and if kept under glass much pure air and full light must be given, as they spoil in close heat. These can be obtained in autumn, or after the winter is past. Towards the end of March put them into larger pots, say "forty-eights," using three-fourths fibrous loam and the other fourth rotted manure and leaf mould, with a suspicion of silver sand and a few pieces of charcoal, the size of peas—well drain and pot firmly. The plants should again be placed under glass until they are established in the pots, when they may be stood out of doors, although all the best exhibition blooms are produced under glass, the protection giving them a clearness and lustre not obtainable in the open. As the flower stems mature, cut them all away excepting the centre one, which must be tied to a neat stick about 24 inches long, fixed firmly in the soil. The osiers used by basket-makers answer well, or a neater article is the green painted stick sold at the shops. This single bloom on a lanky stem seems a barbarous custom, devoid of all beauty and artistic merit, nevertheless it is the fashion of the day. The flower buds must be thinned out in an early stage of their formation when fine blooms are wanted. Some varieties have a tendency to burst the cup which holds the petals; this is prevented by tying it securely, but loosely, with a strip of matting (see illustration, page 102). Take out all side shoots not needed, as soon as large enough to be pinched with the finger and thumb. Syringe

occasionally in fine weather to keep down vermin, and protect the flower from strong sun as soon as it shows colour in summer. These instructions apply equally to the show picotee.

Tree or perpetual carnations are of service for flowering in the autumn, winter, and spring under glass. They are usually increased by cuttings taken from the stem of the plant and put in any time from January to April, four in a pot, in a little heat, potted off singly later on, and pushed forward to produce a succession of bloom in a bush or tree form from September forward. They never require much heat when once rooted, and come into flower without undue forcing. They should always stand near the glass, with an abundance of fresh air at favourable times. If the bush formation is preferred the centre growth must be pinched out before it makes much of a start about June. The Malmaisons are another popular class, with enormous blooms, either blush, pink, scarlet, or striped. These are increased by layers, generally made when summer is at its height, and treated similarly to the show and fancy varieties. Given plenty of light, air, and carefully watered, they will return large quantities of exquisite flowers. Some growers pinch out much of the early growths to make the plants more productive.

The various carnations are divided into classes according to the markings of the flower (see illustration page 102). Under the heading of "selfs," the flower is of one colour only; "fancies," flowers with markings on coloured grounds; "bizarres," flowers striped or variegated with three or four shades of colour; "flakes," flowers of two colours only, striped heavily lengthwise through the petals, and yellow grounds, a new class, fast becoming popular. "Picotees," are classed according to the colour of the edges of the petals. Some precocious varieties lately introduced are known as "Marguerite" carnations," and will blossom a few months after sowing. The Old Crimson Clove is always a great favourite with ladies, being useful for cutting and so sweetly fragrant. It blooms freely in ordinary garden soil, if deep and kept moist in summer, and will make a pretty show during July and August. There is a white kind equally fragrant.

Pinks are easier to manage, and should either be procured in pots, or cuttings (called "pipings" by some gardeners) can be struck

in early summer under a hand light and potted off when rooted. These sometimes come into bloom later in the year if taken under glass in September, whilst cuttings struck last summer and planted out in autumn are in full bloom in clumps the following June, and delightful they are in the early summer garden, dispensing their sweetness around. A good general compost for the whole family may be made up of one-half clean loam with lesser portions of leaf mould, old cowdung, sand, and sifted mortar rubbish, and an occasional watering of soot water will be found beneficial. Pinks bear a good deal of rough usage. A friend of the writer's was desirous this spring of having a bed, but had no plants. Nothing daunted, he purchased about a couple of dozen clumps in April, just as lifted from the ground, and throwing up flowering stems. They were puddled into their new home and kept well watered, and at the beginning of June were a mass of bloom. Now, a professional would never have attempted such a risk at such a season, and it just shows what the amateur will do when he makes up his mind to defy the ordinary practices of expert cultivators.

Of the diseases and insects that attack these plants beyond green-fly and thrips, there are slugs, which can be caught by examining the plants with a light at night. In spring the carnation maggot sometimes enters the heart of the plant, and, unless checked, soon destroys it. The only remedy is to get it out. Spot disease generally arises from a damp atmosphere, and is generally most troublesome in winter; in warmer and drier weather the plants often grow out of it. Affected parts should be cut away and burnt. If rust appears, treat this similarly.

The following selections are recommended by the National Carnation and Picotee Society:—

TWELVE BIZARRE AND FLAKE CARNATIONS.

Suitable for culture in pots for exhibition, or in borders for garden decoration:

- Scarlet bizarre—Robert Houlgrave, Admiral Curzon.
- Crimson bizarre—J. S. Hedderley, Master Fred.
- Purple bizarre—Harmony, Sarah Payne.
- Rose flake—Mrs. Rowan, Thalja.

Scarlet flake—Guardsman, Sportsman.

Purple flake—Charles Henwood, Gordon Lewis.

TWELVE SELF-COLOURED CARNATIONS.

Cecilia—yellow.

Agnes Sorrel—deep crimson.

Lady Hermione—rose.

Sir Bevys—deep maroon.

Mrs. E. Hambro—white.

Britannia—yellow.

Exile—pink.

Dick Turpin—purple.

Benbow—buff.

Dick Donovan—blush white.

Mr. Cutbush—scarlet.

Mrs. Arthur Gilbey—rosy scarlet.

TWELVE FANCY CARNATIONS.

Charles Martel—yellow, striped scarlet.

Goldyllocks—yellow, splashed scarlet.

Brodich—yellow, flaked rosy red.

Golden Eagle—yellow, marked bright red.

Voltaire—yellow, marked rose.

Persimmon—scarlet maroon, striped slate.

Hidalgo—yellow, edged rich red.

Artemis—scarlet, flaked lavender.

Aglaia—yellow, streaked rosy lavender.

Galileo—yellow, edged purple.

Regent—yellow, marked purple.

Guinevere—buff, suffused pink.

TWELVE YELLOW GROUND PICOTEEES.

Childe Harold—yellow, edged purple.

Lauzun—yellow, edged purple.

Alcinous—yellow, marked rich purple.

Badminton—yellow, margined scarlet.

Heliodorus—yellow, margined crimson.

Galatea—yellow, edged scarlet.

Lady St. Oswald—yellow, margined bright red.

Onda—yellow, edged bright rose.

Daniel Defoe—yellow, margined rose red.

Empress Eugenie—yellow, margined rose.

Mohican—yellow, margined rosy red.

Turenne—yellow, edged rose.

TWELVE WHITE GROUND PICOTEEES.

Red, heavy edged—John Smith, Ganymede.

Red, light edged—Grace Darling, Thomas William.

Purple, heavy edged—Miriam, Amy Robsart.

Purple, light edged—Pride of Leyton, Harry Kenyon.

Rose, heavy edged—Lady Louisa, Mrs. Beswick.

Rose, light edged—Favourite, Fortrose.

TWELVE TREE CARNATIONS.

Comus—white.

Miss Joliffe—rose.

Regalia—rose pink.

Uriah Pike—crimson.

Countess of Warwick—

Patrocles—scarlet.

Primrose Day—yellow.

William Robinson—scarlet.

Terese Franco—pale pink.

Duke of York—deep crimson.

Princess Alice of Monaco—white, rose
centre.

Winter Cheer—deep scarlet.

TWELVE MALMAISON CARNATIONS.

Mrs. Martin Smith—bright rose
pink.

King Oscar—bright crimson.

Lord Rosebery—bright violet.

Mrs. de Satge—scarlet.

Mrs. Trelawny—dark salmon.

Princess May—deep rose.

Calypso—Soft flesh, salmon centre.

Lady Rose—bright rose.

Lady Grimston—blush white, marked
rose.

Baldwin—dark pink.

Florizel—rose.

Albion—dark salmon.

SIX GARDEN PINKS.

Albino—white.

Rector—white and purple.

Clove Pink—deep rose.

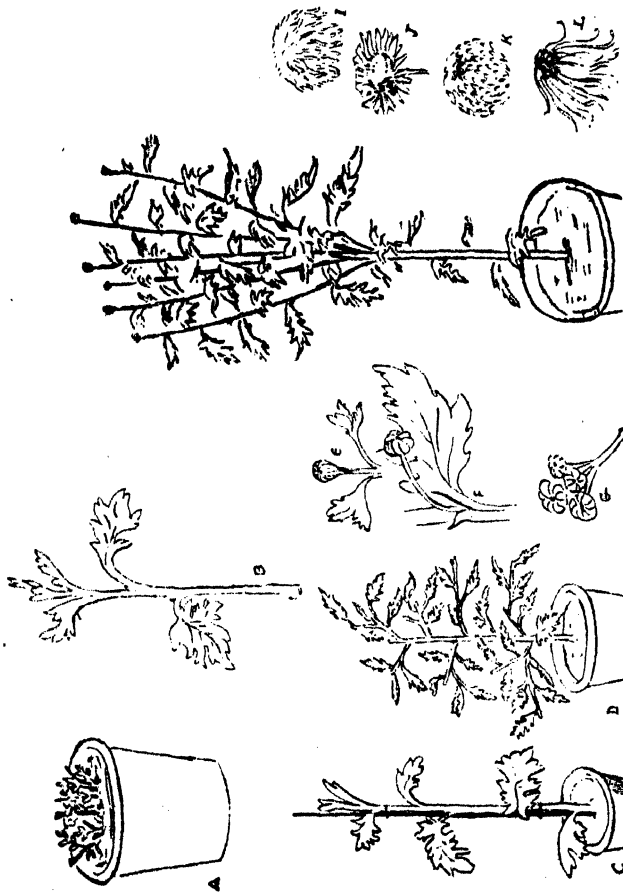
Bertha—white and rose.

Homer—rose, dark centre.

Mrs. Waite—white and red.



Chinese Single Pink.



A.—An old chrysanthemum cut down for producing cuttings. B.—A cutting. C.—A rooted cutting potted off. D.—Points stopped in plant wanted to take a bush form. E.—Crown bud. F.—Terminal bud. G.—A cluster of buds. If nice flowers are wanted, two or three of these should be carefully taken out. H.—Standard in bloom. I.—Reflexed Japanese. J.—Anemone flowered. K.—Incurved Japanese. L.—Decorative Japanese. M.—Reflexed Japanese.

HOW TO GROW CHRYSANTHEMUMS.

In the way of decorative flowers the chrysanthemum reigns queen of the autumn, and its beauties are seen in every garden, from the humble cottage to the conservatory and corridors of the mansion. Exhibitions are held in every county, and the high state of perfection to which the blooms are now brought seems marvellous when compared with the original type, a plant of which was shown before the Royal Horticultural Society last season, with tiny yellow flowers no larger than a daisy. There are few plants which adapt themselves so easily to culture by amateurs, and so well repay the labour bestowed on them, as do chrysanthemums. They bloom at a time when other flowers are scarce, and can be grown in a variety of ways. One great point in their favour is that they take up no room in the greenhouse during the summer, which is a distinct gain.

Now that the varieties and sections are so numerous, a wide range of colour and form can be had by growing selected kinds. We should, nevertheless, like to impress upon amateurs, cultivators, and especially those who are about to undertake the cultivation of this flower for the first time, the great importance of not attempting to grow more than convenience or circumstances will admit. A few plants, if well managed, will give more satisfaction than three times the number crowded together. There are several methods of cultivating them. Perhaps that which finds the most favour is the production of large blooms; no matter whether they be intended for exhibition or home use, the treatment required is the same. The spirit of emulation in the exhibition-room has a fascination for some cultivators. Another style of growth which meets with much favour is that known as "bush" plants, which produce a number of flowers upon each branch, and are so useful for conservatory decoration and for cutting from in quantity. The best kinds for this form of growth are the Japanese, a few of the small-flowered incurved varieties, some of the bright-coloured kinds in the reflexed section, one or two anemone-flowered sorts to give variety, and all the Pompons, both double and single flowers. Especially are the latter

to be recommended, being so free-blooming, besides so light and graceful, either growing on the plants or in a cut state.

For the production of large blooms the chrysanthemum requires a long season of steady growth, so that the wood will become thoroughly matured in a natural manner; in this state the plants cannot well fail to develop good blooms, and to produce plants of this character the cuttings should be inserted early. From the beginning of December until the middle of January, as they can be had, is a suitable period for taking the cuttings, and for "bushes," from the middle of January till the same time in February is a fitting time. The best place in which to strike the cuttings is a greenhouse, or under hand-lights. Where such conveniences do not exist, the cuttings may be rooted in cold frames, either by inserting them in pots first, or "dibbling" them into sandy soil. More care is needed to prevent their being frozen, or the leaves and stems from damping, than is required in a cool house. It is a bad plan for the uninitiated to attempt to strike the cuttings in bottom-heat, as there is a risk in drawing the growth up weakly.

Prepare a sufficient number of clean $2\frac{1}{2}$ inch pots, by first placing one small crock over the holes at the bottom. On this place a small portion of the roughest parts of the compost, which should consist of half-fibry loam and leaf-mould, with a liberal addition of clean silver-sand, passing all through a half-inch sieve. Press the soil into the pot firmly, placing a pinch of sand on the top of the soil, which is carried to the bottom of the hole with the dibbler, on which the cuttings rest, as they make roots quicker in sand than soil. The cuttings should be taken off, 3 to 4 inches in length, from the base of the old plants that have been cut down after flowering, selecting those which are stout and healthy, but not too sappy; reject any that have bloom-buds in the point; those which grow a few inches away from the stem are to be preferred. Remove the pair of lower leaves, cut square across below a joint, insert the cuttings firmly in the soil, and give a good watering to settle the latter about the cuttings (see illustration, page 110). If the cuttings are to be struck in the frames without the aid of pots, dibble them into the soil (which should be 3 inches deep and made firm) about 3 inches apart. When the cuttings have formed roots, air should be gradually given them in suitable weather, increasing the supply as growth proceeds. When cutting pots are full of roots in spring,

transfer the plants to larger pots—those $3\frac{1}{2}$ inches across will answer well to begin with. Cuttings which were rooted in the soil in the frames should also be potted in this size, and a suitable soil for the purpose may be made up of three-parts of good turfy loam, one-part well-decayed manure, and one-part silver sand. It should not be sifted too finely, as a slight roughness in the texture assists to make it porous. Care must be taken with the cuttings, that should be well rooted, and, if possible, retain some portion of the soil with them, rather than that they should be shaken free of it; then proceed as follows: Place a piece of crock at the bottom of the pot large enough to more than cover the whole; over this put half-a-dozen smaller pieces, and on top of these put a piece of any rough turf—the object of this is to keep the finer soil from getting amongst the drainage—then fill up the pot with the prepared soil, make a hole in the centre with the finger, and into this put the rooted cutting. The soil should then be pressed firmly around the plant, and, when finished, there must be quite half an inch of space between the soil and the top of the pot. Give a gentle, but sufficient watering, that is, enough to come through the bottom of the pot, then stand the plant on ashes in a cold frame or similar place, keeping it closed for a few days to enable it to get over the change; this will be readily perceived by the foliage looking fresh and lovely, when air may be given on every favourable occasion.

Professional gardeners, and those who grow the chrysanthemum for exhibition, give the plants another move before they reach the pot in which they are intended to produce the season's flowers, but for our purpose a move to a 32 size pot will answer admirably. This will probably take place about the end of May or early in June. The compost will be as before, but the addition of half a handful of soot to each pot of soil will be beneficial. Pot firmly.

Those plants intended for bushes should have the point of growth pinched out when 9 inches high, which induces side-growths to form. When these shoots have grown 4 inches more in length, again pinch out the points to form the foundation for the future bush. If the blooms are wanted in November the last stopping should be in June. As soon as the pots are again full of roots, more space must be given them; pots 6 inches should be employed, using soil similar to that previously named. The tops of the plants, when trimmed down, may be formed into cuttings in the ordinary

way. Insert them singly in $2\frac{1}{2}$ inch pots, and stand them in a frame on a moist base, keep shaded from strong sun. In a short time air must be admitted in gradually increasing quantity until the plants can be fully exposed. By this time a shift into a larger pot is necessary. The final size for these plants may be $7\frac{1}{2}$ inches. Grow them without stopping in any way, confining simply to one stem. As soon as the flowering pots are full of roots, commence to feed, and very useful plants, with fair-sized blooms, will follow. Pay strict attention to supplying the roots with water as needed, never allowing the soil to become dry, or the leaves at the bottom will turn yellow, which disfigures their appearance.

Chrysanthemum plants standing out of doors in the summer often suffer severely from drought. It is a good plan to plunge the pots into the ground, which assists greatly to keep the roots cool. This is how I always serve mine, and we get an excellent show of blossoms when taken under cover in autumn. For a useful liquid manure see page 23.

Cultivators for exhibition only permit about three blossoms on a plant, and frequently only one. This is all very well for their purpose, but these notes are written for those who grow the plant to decorate their conservatories. Still, it is necessary to remove a few, and the operation is shown in the illustration (see page 110). It is a mistake to begin overfeeding at too young a stage, the plants resent it. When they are applied, liquid made from various kinds of animal manure is better than confining the application to one kind only. Soot water is especially beneficial. Solutions of guano or of artificial manure may be used as a change, alternating frequently with clear water. Close attention must be given to the watering, for on this largely depends the health, cleanliness, and ultimate success.

The black fly, which often breeds in the points, must be got rid of, either by dipping in soap suds, or tilting the plant and syringing it severely. Tobacco powder dusted on the affected parts will kill both black and green fly. Mildew attacks the leaves, and if not quickly checked by dusting the affected parts with sulphur, much damage will be done, not only to the appearance of the plants, but to the detriment of the flowers also.

HOW TO GROW PLANTS FROM CUTTINGS.

What is a cutting or slip in gardening parlance? It is a piece detached from an established plant, cut according to approved principles, and put into prepared earth in the hope that it will root there and ultimately become a perfect plant. The propagation of plants is an occupation needing constant attention, and a gardener has to look ahead in his operations, for no sooner does he provide for one season's supply of foliage and blossom than he must make his preparations for the future. Next year's flower garden is created out of this year's, and in such a manner the beds of one season, whilst displaying their beauty at the moment, are the means employed to furnish plants for the succeeding one.

It may be worth while to offer some hints as to the principle of increasing the stock of plants by cuttings. This mode of propagation relates to the great mass of flower-garden plants, and by it many sorts of trees and shrubs may be readily increased, as well as several soft-wooded herbaceous plants. In respect to the choice of cuttings, those branches of trees and shrubs which are thrown out nearest the ground will always have the greatest tendency to produce roots, and main stems on which the flowers are chiefly produced should never be used. Cuttings, then, are to be chosen from the side shoots of plants rather than from their summits; and, the strength and health of side shoots being equal, those nearest the ground should be preferred. The proper time for taking cuttings off the parent plant is when the sap is in full motion, in order that, in returning by the skin, it may form a callus, or protruding ring of granular substance between the skin and flesh, from which the roots emanate.

There are many sorts of shrubs and trees the cuttings of which can be successfully rooted at almost any season, even when the sap is comparatively at rest. In these and others the principle of life seems so strong and so uniformly diffused over the whole vegetable

that very little care is requisite for their propagation. An instance of this is frequently seen when the stem out of a young osier or willow is used for staking purposes. It will often send out growths and ultimately take root without any attention whatever, and become a perfect plant; whilst a suitable piece of the growth of the oleander, if kept in water, will produce roots freely. Cuttings from herbaceous plants are usually chosen from the low growths, which do not indicate a tendency to blossom; but they will also succeed, in many cases, when taken from the flower-stems, and some rare sorts of florists' and border-flowers are so propagated. Usually they root most readily when the condition of the wood is in an intermediate state between the immature texture of new-born development and the consistency and condition of ripened maturity. As to the precise season, the condition just noticed will be found to exist about September, at any rate, with most bedding plants, such as the ever-popular geranium.

The preparation of the cutting depends upon, or is guided by, this principle—that the power of protruding buds or roots resides chiefly at what are called points, or at those parts where leaves or buds already exist. Hence it is that cuttings ought always to be cut across, close below an eye or joint. In some hard-wooded plants the buds are found in a more advanced state in wood somewhat ripened, or fully formed, than in that which is still in a state of formation; cuttings ought in such cases to be made in the wood of the growth of the preceding season, or, as it were, in the point between the two growths. It is true that there are many sorts of cuttings which not only throw out roots from the ring of granulated matter, but also from the sides of every part of the stem inserted in the soil, whether old and large, or young and small. It is a common practice to cut off the whole or a greater part of the leaves of cuttings; but unless skilfully done it is always attended with bad effects, as the leaves may be said to supply nourishment to the cutting till it can sustain itself. This is very obvious in the case of striking soft-wooded plants from buds or eyes, which without a leaf attached speedily rot and die. When the leaves are of moderate size and not too closely situated, the lowest pair is quite sufficient for removal. (See illustration page 118).

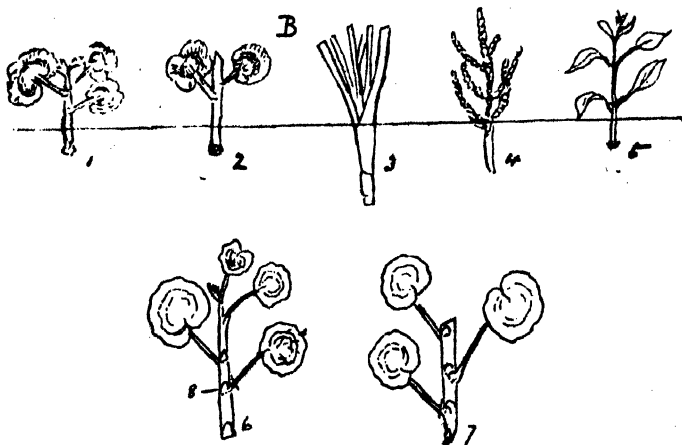
Cuttings of most bedding plants, such as geraniums, root readily at all seasons from August, and indoors till March, if kept under glass. Some of the best bedding geraniums the writer has this summer were the tops taken in February from cuttings put in and rooted in pots during the previous autumn. All they require is a sandy soil and a little moisture, and a dry greenhouse shelf is a preferable place during such a season than a damp floor, or in a frame. It is usual to insert ten in a forty-eight-size pot, and pot them off singly when rooted. They then require a little nursing, when they may be gradually hardened off to bear the proper treatment for their respective kinds, very little water being required through the winter, and all signs of withered growth picked off. Cuttings of some tender things root more freely when planted round the inside of the pot than when placed in a mass of cold soil, and it is the common practice of some experts to insert an inverted flower pot, as large as can possibly be got in, into a larger size and fill up the cavity around it with crocks topped with sandy soil. Into this the cuttings are inserted. Such things as bouvardias root quickly in this way, but geraniums, heliotropes, fuchsias, and such-like, which root freely, do not need this careful treatment.

As to the methods of taking cuttings from geraniums, it should be done with some kind of system, during the months of August and September without spoiling the autumnal beauty of the beds. During the first few weeks cold pits, frames, and hand-lights are the best places for most of our common bedding plant-cuttings, such as petunias, calceolarias, verbenas, etc., shaded for several hours during the day. The soil should be sandy loam, say half and half, with an inch more sand at the top. Whilst most cuttings should not be allowed to droop or flag, a few days' delay between the time of taking and potting seems to have quite the opposite effect upon geraniums, for it dries out excessive moistures in the tissues, and hardens the cuttings to withstand very severe treatment.

It should be remembered no cutting is tight enough in the ground if it can be easily pulled out. The soil around it must be firm, or it may take a long time for the new roots to be enticed to work their way into the fresh surroundings. Two good soakings

are generally all the waterings that most autumn cuttings require, unless a very hot time ensues, when they must have more, carefully applied. All the same, if a cutting gets withered too much its juices are expended, and it may not have sufficient strength to recover.

A cool, shaded border appears to be the most popular place for striking all sorts of hardy herbaceous plants, from cuttings and suckers, and such a situation should be found in what is generally called the reserve garden.



How to make and insert cuttings in the soil.

1 and 2.—Geranium. 3.—Carnation or pink. 4.—Lycopodium and selaginella. 5.—Fuchsia, verbena and such like. 6.—Showing the cut at a joint. 7.—A beeled cutting, the lower part of the growth pulled off the main stem of the plant. Such a cutting roots very quickly. 8.—These little collars should be cut away, as they wither and often cause the stem to damp off in winter.

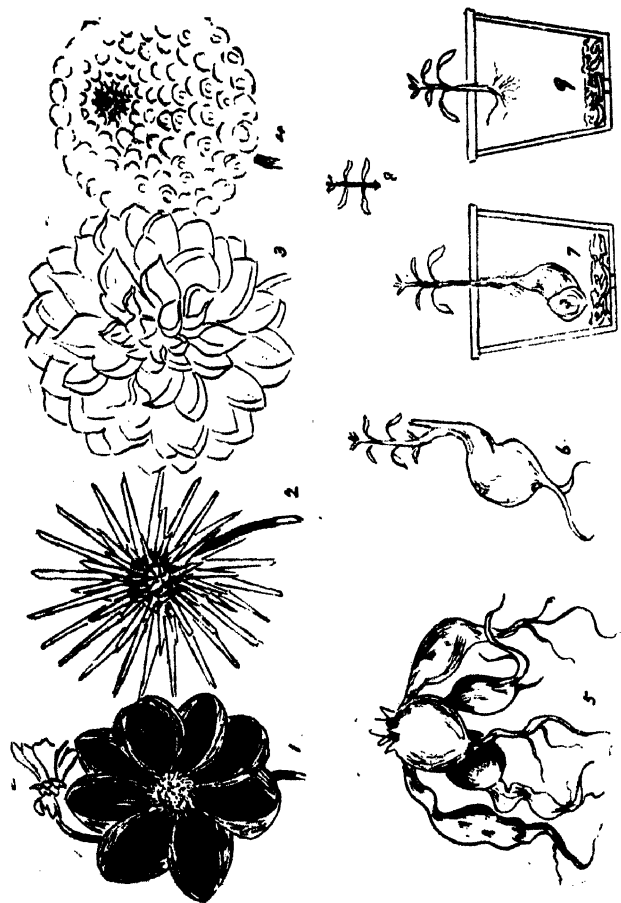
THE CINERARIA.

Among the many species of plants used for decoration purposes none are more strikingly handsome in the conservatory than the cineraria, and the primary object essential in the cultivation of this brilliantly-coloured flower is to procure a compost that will grow the plants well. This should consist of two parts good light fresh loam, one part thoroughly decomposed leaf-mould, and one part sharp sand—the whole well mixed together, but not necessarily sifted. Put in crocks to the depth of, say, two inches; on the top of this let there be a layer of rough soil, the whole being filled up with finer mould. Level the surface by means of a flat piece of wood, water sufficiently to wet the soil through, allowing the now sufficiently-prepared pan to remain three or four hours before anything further is done. The seed should be sown on the surface of the soil and pressed lightly down with something flat. There is no need for it to be covered; on the contrary, the amateur is at times a little too apt to bury these and similar small seeds too deeply. The sowing being complete, cover the top of the pot with a piece of glass, and place in a shaded cool-pit or frame. It is by no means a bad plan to cover the seed-pan with a piece of brown paper, the seeds germinating with more freedom in the dark; but if used, the paper should be removed as soon as the seedlings appear. The last week in April or the first week in May is generally considered about the best time to sow the seed for early-flowering plants.

When the plants have formed three or four leaves, pot them off into small "sixties," using the same soil as for the seed, place them in a cold frame kept close, shading from the sun for a week or ten days. If the frame can be moved to a west aspect so much the better, less shading being then required. In about a month, should all go well, they will require another shift, this time into pots five inches in diameter, or what are technically known as "forty-eights." For this and the succeeding shifts there should be added to the soil about a fourth of dry decayed cow dung.

The cineraria, being a quick-rooting plant, will soon require another shift. Repot now into "thirty-twos," or six-inch pots—a size sufficiently large for general purposes. Water should be applied after each potting, sufficient being given to soak the soil.

Let air be given abundantly when there is no actual frost, avoiding draughts, for the cooler the temperature in which the cineraria is grown the dwarfer and more robust is its habit. It flowers from February to June.



Distinct types of Dahlias, with methods of propagation.

1.—Single. 2.—Cactus. 3.—Decorative. 4.—Show. 5.—Tubers. 6.—Cut Root for growing on. 7.—Pot Root. 8.—Cutting. 9.—Rooted Cutting. See page 122.

HOW TO GROW DAHLIAS.

We often find the term "florist's flowers" used in articles on gardening, but no information is imparted as to the definition of the expression; it is left, as is customary with many professional writers, to the imagination of the uninitiated. The words may be variously defined. For our purpose they represent a series of plants which, by dint of expert treatment and high culture, have been drawn out of their natural state into objects of great beauty. In some instances the work has been accomplished, after years of labour, by specialists who have become interested in it first of all as a hobby. The class comprises all such plants as produce seeds, from which advanced types are selected, improved, and perpetuated. At the present time some are represented by societies managed by the greatest authorities on the particular plant concerned; the auricula, carnation, dahlia, and tulip are all controlled in this manner, the latest addition being the sweet pea. Of other plants that are popular with florists, the finest strains are mainly in the hands of the best seedsmen. These embrace the primula, cineraria, calceolaria, begonia, cyclamen, and pansy.

The dahlia is a well-known garden plant, and from a florist's point of view ranks next in importance to the rose. The history of the flower, which has no stately ancient legends, discloses the fact that it has attained its present grandeur through the most persistent efforts of the expert cultivator, extending over the period of a century, and no plant ever yielded more readily to the florist's art. Not only has it been improved in its flowers, for when the dahlia was quite a rarity in gardens it grew about 8 feet high, but continued selection has dwarfed the growth, so that the bushy habit of 3 feet to 4 feet renders the plant at once stately and manageable. It is so readily improved in size and form, and sports into such endless varieties in stature, leaves, and flowers, that it has become one of the most extensively cultivated of garden plants. Its innumerable sorts are the glory of our borders towards

the end of summer, and it stands quite unrivalled at that season of the year. They are, however, destroyed by the earliest frosts.

In olden times the roots were saved each autumn and replanted entire, and the plants obtained enormous vigour; but now it is the general practice amongst gardeners to strike cuttings from the first shoots, or cut up the roots, and the result is a diminution of over-luxuriant growth, but, with the desirable accommodation of habit, we also have an augmentation of the size and fulness of the flowers. To such an extent has this dwarfing been secured by selection that pigmy varieties are obtainable which reach only a height of about a foot. To obtain cuttings the old roots are put into a state of growth early in the season, and the young shoots which spring from them are employed as cuttings. Some growers excite their dahlia roots as early as December or January, in a moist, warm atmosphere, and continue taking cuttings off them until a sufficient number of plants of the desired kind are obtained. For ordinary purposes, the beginning of March is a good time to put the roots into a situation to grow, which is usually done when on a small scale, by potting them in light mould, in large pots, and placing them in a hotbed, frame, vinery, plant-stove, or in any other convenient place. When the shoots are from 2 to 3 inches in length they may be cut off close to the old tuber, but not so as to injure its top or crown, because many more shoots will arise from it, if required. The cuttings are prepared by cutting the shoot smoothly across, under the first joint, and, *without* shortening the leaves, planting it into the smallest-sized pots into a light soil, chiefly composed of decayed leaves and sand, or, in pure white sand alone (see illustration page 120). The sand should be well wetted, and the cutting inserted just as far as will enable it to stand upright; for, like most other cuttings, the shallower they are planted the better. When the cuttings are so planted, they should be plunged in a brisk bottom-heat, covered with a hand-glass, and regularly shaded and watered, but not over the leaves, and kept close shut up, unless to inspect the plants. In fourteen days they will have sufficiently rooted to be taken from under the glasses, and should be accustomed to the air by degrees. When they will stand without flagging or drooping their leaves, they may then be transplanted into larger pots and into richer mould: the sand being previously shaken from them, they must now be progressively hardened, until they will stand the air and temperature

of a close frame or cold pit; but in these they will require to be covered at night with mats, till early in May, when they must be accustomed to stand the open air, so that they may be planted out where they are to flower that month. Sometimes dahlia plants are forward enough by the first of May; but as it would be unsafe to expose them so early in the season, it will be well, if planted so early, to give them the protection of a frame for a week or two. Cuttings are also taken off the plants during their growth, any time from June to September. The shoots best calculated for this sort of propagation are those small lateral branches which in general abound upon the plants; these may be successfully struck, by being planted in sand, in small pots, and placed behind a wall or other shaded situation, and covered with a hand-glass, and otherwise treated as above. The process of multiplying by dividing the root is simple, and requires nothing beyond the careful separation of the tubes, each piece having a portion of the crown of the root attached to it, in which there are two or more eyes or buds, without which they would not grow. A visit to the annual show of the National Dahlia Society will impress the observer with a notion of the range of variation in characters of the different species and varieties; indeed, a first-class show blossom has more the appearance of a geometrical model painted with the severest precision than any other flower. It was found difficult to ensure the enormous heads of some kinds being safely carried on their stalks, and owing, to some extent, to this cause a sudden reversion was made some years ago to the cultivation of lighter and more elegant types, and the single dahlia quickly became popular. Many beautiful forms have since been introduced, but the taste for the single original type lasted for quite a decade.

Now the rage is for the cactus dahlia, a type with starry-pointed petals, which had its origin in an importation from Mexico within the last thirty years, and this class is now so large and varied, so light and elegant in construction, and new colours are continually being added, that it embraces all that is graceful and beautiful. For cutting purposes it stands ahead of all its rivals, and long may it flourish in our gardens.

When an order is given to a nurseryman it is the custom for him to deliver plants in May. They are usually in small pots, about 6 inches high, and on a single stem, and have most probably been

produced from cuttings; but if strong plants are procured they will be grown from what is known as pot roots—that is, portions of the potato-like roots saved from the previous year's plants and kept during winter, cut up and repotted directly they show growth, and become quite robust by now. It is the firm opinion of some growers that better flowers are secured than from young green plants, and they also bloom earlier. However, the latter concerns us more just now, and I advise that as soon as they are received they be repotted in rich loam in 48-size pots and kept in frames for a week or so, shaded from hot sun, and not planted out until June is well in, according to the weather, as one check hinders the growth seriously. The robust varieties are generally planted to stand 4 feet apart, and this is how to do it. Make a hole with a trowel suitable to carry the plant about an inch above the soil in the pot, and it must be deep enough for the plant to appear, as it were, in the centre of a shallow basin when planted. Place three fingers of the left hand on the soil of the pot, so that the plant comes between the fingers, turn the pot up, give the rim a gentle tap on the side with something handy, and then you will have the contents in a solid mass complete in your hand, and have only to turn it over neatly into the hole without breaking it.

Although the dahlia delights in a rich soil, it is often ruined through being overfed, which induces a heavy growth of foliage, occupying a large part of the summer to produce, and the flowers are not profusely borne until the first frost of autumn comes along and cuts down the plant at the height of its beauty. The best soil is a sandy loam enriched with vegetable mould, or cut up turfs mixed with it just as taken fresh from a pasture. Then, again, its blooms often fail to perfect themselves chiefly owing to dryness at the root, and it is surprising what a quantity of water a strong plant will absorb. It does not do to sprinkle a pint or so over the top; this is courting disaster. Take a long-pronged fork and carefully work it into the soil all round the plants from 1 to 2 feet away, and thoroughly soak the soil with pond or river water, say, a couple of pailsful to each plant, poured on gently to give it a chance to filter away. This should be done every other evening on dry soils, and less frequently on heavy soils, at the height of summer. Liquid manure is only required on poor soils when the plant has reached its full growth.

The dahlia is an ornamental plant in its natural habit of growth, and does not need much hacking about. It may be taken safely enough as an improved fact that the less flowers there are permitted to perfect themselves on the branch the stronger they will come, consequently, there should be no mistake in thinning the buds. It is necessary to allow the buds to advance far enough to promise a perfect bloom before removing any, or the best may be taken. Then, again, all blooms should be cut away with their stems directly they are over; this mode of treatment saves the strength for succeeding blooms. Stake the growth firmly, the stoutest stake should be from 2 feet to 4 feet up the centre, with others for the side growths, which easily break in a strong wind. Do not stop the centre growth unless it becomes unmanageable.

Earwigs are terribly destructive to the leaves and flowers of the dahlia, and the favourite custom of placing an inverted flower pot on top of a stake to catch them is by no means an ornament. I have tried with much success the following simple remedy:—Smear a sheet of newspaper with melted sugar, crumple it up and place it in the heart of the plant near the stem so that they can readily crawl into it. Open it out about twice a week over a pail of water. A good many earwigs and caterpillars may be captured by this means, and as the paper can be almost hidden it is not an eyesore in the border.

When the dahlia is checked by the first frost, the growth should be cut down to within 6 inches of the ground, the bunch of roots carefully lifted and laid on a mat in a shed with the more adhesive soil still clinging. When thoroughly dry stow away in clean ashes, and keep in a place where frost cannot reach them, and attach a label with the name upon it. Look over them about once a month through the winter, to see that they are not rotting, and in this position they may remain until spring. The habit of storing the roots under a greenhouse staging is an untidy custom.

By the courtesy of the National Dahlia Society I am able to furnish particulars of the best selections to make an effective display in the garden on account of their good habit and stiff flower stems. Average heights are also given.

TWELVE EXHIBITION DAHLIAS.

- Perfection.—Orange. 4 feet.
 R. T. Rawlings.—Yellow. 3 feet.
 Mrs. Langtry.—Cream, edged red. 4 feet.
 Prince of Denmark.—Maroon. $3\frac{1}{2}$ feet.
 Sunbeam.—Orange-buff. 4 feet.
 Eclipse.—Scarlet. 3 feet.
 Mrs. W. Slack.—White, edged purple. $3\frac{1}{2}$ feet.
 Queen of the Belgians.—Cream, tinged pink. 4 feet.
 Octavia.—Orange-yellow, edged crimson. $3\frac{1}{2}$ feet.
 John Walker.—White. $2\frac{1}{2}$ feet.
 Crimson King.—Crimson. 3 feet.
 Willie Garratt.—Cardinal. $3\frac{1}{2}$ feet.

TWELVE CACTUS DAHLIAS.

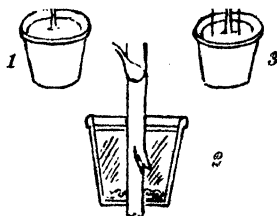
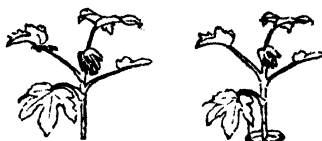
- Distinct colours, good habit, and freedom of flowering:
 Alfred Vasey.—Reddish amber. $3\frac{1}{2}$ feet.
 Beatrice.—Lilac. 5 feet.
 Britannia.—Pale salmon. 3 feet.
 Countess of Lonsdale.—Salmon-pink. 3 feet.
 Lord Roberts.—White. 4 feet.
 Lucius.—Orange. $3\frac{1}{2}$ feet.
 Mrs. J. J. Crowe.—Yellow. 4 feet.
 Uncle Tom.—Maroon. $3\frac{1}{2}$ feet.
 Magnificent.—Pale buff. $3\frac{1}{2}$ feet.
 Mary Service.—Rosy heliotrope. 4 feet.
 Regulus.—Crimson Scarlet. 4 feet.
 Starfish.—Scarlet. 4 feet.

TWELVE POMPON DAHLIAS.

- Annie Holton.—Crimson, tipped with white. 3 feet.
 Bacchus.—Scarlet. 3 feet.
 Douglas.—Maroon. 3 feet.
 Eurydice.—Blush, edged with purple. 4 feet.
 Eva.—Carmine. 3 feet.
 Fashion.—Orange. 3 feet.
 Janet.—Salmon. 3 feet.
 Marion.—Rich yellow. $3\frac{1}{2}$ feet.
 Martial.—Crimson. 3 feet.
 Nerissa.—Rose. 3 feet.
 Whisper.—Yellow. $2\frac{1}{2}$ feet.
 White Aster.—White. 4 feet.

TWELVE SINGLE DAHLIAS.

- Amos Perry.—Velvety maroon. 3 feet.
 Aurora.—Amber, suffused with orange. 3 feet.
 Demon.—Darkest maroon. $3\frac{1}{2}$ feet.
 Jack Sheppard.—Yellow, striped red. $3\frac{1}{2}$ feet.
 Leslie Searle.—Lilac, with crimson ring. 3 feet.
 Miss Morland.—Crimson. 3 feet.
 Miss Roberts.—Yellow. 4 feet.
 Northern Star.—Red, edged buff. 4 feet.
 Polly Eccles.—Fawn, with crimson ring. $2\frac{1}{2}$ feet.
 Phyllis.—White, striped crimson-purple. 3 feet.
 The Bride.—White. 4 feet.
 Victoria.—White, edged crimson. 3 feet.



How to dwarf a long stemmed plant.

1. A lanky Aralia. 2. A pot broken in half, joined again, filled with soil, and held by supports round the plant as shown in 3.

HERBACEOUS PLANTS.

Fashion is as dominant in gardening as in other pleasures of life, and runs in stated directions. All do not follow the same branch, but the majority indulge in the prevailing tastes. Within present recollections no garden was considered complete unless its flower beds were decorated with a carpet of compact growths exhibiting a flaunting flare of colour. Happily this conglomeration of gaudy brightness is now a fast declining feature. The style consumed heaps of money every year, and in short summers failed to compensate. A mere trifle of the amount judiciously expended in hardy flowering perennials always affords greater satisfaction, and it now seems remarkable how plants of such sterling merit were ever allowed to lapse into a state of neglect and be supplanted by this unnatural and inartistic method of plant herding called carpet bedding.

Hardy herbaceous perennials are a class of plants distinct in their nature from annuals and biennials, inasmuch as they live for an indefinite period of years, and they also differ from shrubs in the limited and less woody nature of their growth, and in dying down to the ground every year after they have flowered, when their leaves and stems have performed the functions necessary for their future well-being. There are three classes of herbaceous perennials, known by the formation of their roots, namely, bulbous, tuberous, and fibrous. The first section includes such beautiful things as lilies, gladiolus, and daffodils; indeed, all the plants under this heading, most of which are planted in the autumn. The tuberous kinds comprise many bold things, such as dielytra, pæony, dahlia, and iris, also anemone and ranunculus; whilst among the fibrous rooted may be named phlox, poppy, hollyhock, and most of those mentioned in our list on page 130.

There are many other species that may be included in collections with advantage, the chief point being to procure such as will with certainty produce brightly coloured flowers at a time when they are most wanted. By a little management a wonderful diversity of

colour is secured, and the greater the ingenuity and taste employed in this direction the more pleasing the effect. When once a good border of herbaceous perennials is obtained, it is more showy and less troublesome than any other style of gardening; indeed, it may remain undisturbed for years, except for an occasional loosening of the surface, and sometimes a dressing of manure in early winter. It is, however, advisable to lift the plants out every few years, trench the bed, and replant, trimming up those species that have grown beyond bounds. Some are certain to be more robust than others, and would ultimately quite smother their weaker neighbours.

In the compilation of the list overleaf due consideration has been given to the fact that the plants are to be grown by amateur gardeners, the value of the collection for producing flowers from May to November, and their usefulness for cutting for house decoration in the greatest range of colours. During the autumn an established border should be cleaned up, forked over, and lightly manured with material that has done duty for a hot-bed or frame, and it may be enlivened during the winter and early spring months by dotting here and there clumps of bulbous plants, such as aconites, crocus, snowdrops, scillas, daffodils, narcissus, and crown imperials. All the plants enumerated will thrive in ordinary garden soil, and if deeply dug and well-manured they will luxuriate to still better advantage. In the preparation of a fresh plantation it is advisable to give some consideration to these details while the opportunity occurs, the benefits of which will manifest themselves later on.

There are many beautiful things not included in the list. They mostly bear such bold and expanding foliage that they are best grown in beds or borders by themselves, as their growth in a restricted space would certainly smother those of delicate habit. We may name among these robust members the pæony, dahlia, hollyhock, Oriental poppy, verbascum, gunnera, and kniphofia, which is the new title for the tritoma, better known as the redhot poker plant. Several nurserymen make quite a speciality of this class of plants, and their annual publications should be obtained when a large and varied assortment is required, as they contain the most interesting particulars.

Name.	Height in feet.	Month of flowering.	Colour.
<i>Achillea ptarmica</i> ...	1½	7 to 9	White.
<i>Anemone japonica</i> ...	2 to 3	8 to 10	Various.
<i>Aquilegia</i> of sorts ...	1 to 2	6 to 7	Various.
<i>Anthericum liliastrum</i> ..	1 to 2	5 to 6	White.
<i>Alstræmeria aurea</i> ...	2	6 to 8	Yellow.
<i>Chelone coccinea</i> ...	2	7 to 9	Red.
<i>Chrysanthemum</i> of sorts	2 to 3	8 to 11	Various.
<i>Coreopsis lanceolata</i> ...	2 to 3	7 to 10	Yellow.
<i>Dielytra spectabilis</i> ...	2	5 to 7	Pink.
<i>Delphinium</i> of sorts ...	4	6 to 7	Blue.
<i>Gaillardia</i> of sorts ..	2	7 to 9	Orange red.
<i>Gypsophila paniculata</i> ..	3	7 to 9	White.
<i>Harpalum rigidum</i> ...	3	7 to 9	Yellow.
<i>Helenium pumilum</i> ...	1½	7 to 9	Yellow.
<i>Helianthus</i> , single ...	4	7 to 10	Yellow.
<i>Hemerocallis flava</i> ...	1½	5 to 7	Yellow.
<i>Lychnis</i> of sorts ...	1½	6 to 9	Various.
<i>Lupinus polyphyllus</i> ...	3	7 to 8	Blue.
<i>Michaelmas Daisies</i> ...	2	8 to 11	Various.
<i>Montbretia</i> of sorts ...	1½	7 to 9	Various.
<i>Poppy</i> , Iceland... ..	1	5 to 6	Various.
<i>Polemonium Richardsoni</i>	1½	6 to 8	Lilac.
<i>Phlox</i> of sorts	2 to 3	7 to 9	Various.
<i>Pyrethrum</i> of sorts ...	1 to 2	5 to 7	Various.
<i>Rudbeckia Newmanii</i> .	2	7 to 8	Yellow.
<i>Spiræa</i> of sorts	2 to 4	6 to 7	Various.
<i>Solidago rugosa</i>	4	8 to 9	Yellow.
<i>Scabiosa caucassia</i> ...	2	7 to 9	Violet.
<i>Trollius Europæus</i> ...	1½	5 to 6	Yellow.
<i>Veronica subsessilis</i> ...	2	7 to 9	Blue.

As the whole of these hardy plants are obtainable in pots from the nurserymen, the border may be made at any season excepting the height of summer and the depth of winter.

ROCK AND ALPINE GARDENS.

The revived interest taken in Alpine and rockery plants is very significant. At a leading flower show held in London recently one could not but notice the great attention given to this phase of gardening, particularly by ladies, who were busy marking lists or taking notes of plants that caught their fancy, and in this connection it seemed to us a pity that some of the trade exhibitors did not take better care in plainly labelling the examples staged. Happily, a rock or Alpine garden is one which an enthusiast can manage with his own hands when once it is formed, and although the climatic conditions prevailing may not be quite in accordance with the natural requirements of a plant coming originally from the keen surroundings of a high and cool mountain home, it is astonishing what numbers of them will thrive in gardens under apparently the most adverse surroundings. The greater the altitude of their natural habitat, the dwarfer they seem to grow, and no doubt assume this form, as it were, to shrink from the coolness of the air, and cling to the soil on account of the sun-heat which it absorbs. Associated with these gems of the uplands are also a number of other hardy plants that do not come from mountainous regions, but which likewise adapt themselves to varying conditions. As these plants are obtainable in pots, a rock or Alpine garden can readily be formed at any time from spring to autumn.

A rockery in a small establishment must necessarily be of artificial construction, and composed of birrs, flagstones, or flints, interspersed with a few petrifications, shells, and rock crystals, or any interesting specimens of mineral substances that may be available, and, although these fanciful decorations will be prominent for the first year or two, they should ultimately be hidden beneath a wealth of flower and foliage. The best aspect for a rock garden is from north-east to south-west, giving the fullest opportunity to both the sun-loving and those species that delight in partial shade. It is generally situated in some recess, or at points where paths meet, and forms an object upon which the eye can rest in walks through lawns, shrubberies, and wilderness scenery. The ground itself produces the effects by its undulations, made by being raised in one

place and lowered in another. The usual height is about 4 feet or more, according to space at command. Stumps of trees sometimes form a part of the decoration, but unless skilfully arranged these additions often spoil the whole scheme. Besides, they rot so quickly when partly buried in the soil. Such a garden also contains all plants which from their minute size or difficulty of culture are not adapted for the general flower-beds and borders; indeed, it is looked upon as a collection of vegetating curiosities, and great is the pleasure it affords to lovers of the unique.

In choosing the situation for a rockery it is important to have a free circulation of air, and containing, either naturally or artificially, portions fully exposed to the sun, as well as others completely shaded, as the plants entering this sort of garden depend for support more upon pure air than upon richness or depth of soil. Sometimes situations naturally occur that are uninteresting, but with a little trouble they can be brought to become a feature of the place. Where imitation of natural rocks is attempted it is in the crevices and between the stones that the most curious and rare Alpines will succeed, if planted in a surface congenial to their several natures. A compost of half-sandy loam and half-peat earth will be found to suit nine-tenths of the plants in this type of garden, and if a little lime rubbish is incorporated it will do for all. The soil does not require to be sifted or made too firm, so long as it is well worked in and consolidated between the stones to enable the deeply-penetrating roots to get well away from the surface, and not likely to become parched up in dry weather.

Some amount of care must be given to the planting, so that when watered it will not all run away over a sloping surface instead of soaking into the soil. A slight sprinkling of water during summer does really more harm than good, as the roots in dry weather are always on the search for moisture, and if they cannot find this down below they naturally turn upwards to get the benefit of the application near the surface, where they suffer more from drought than they would do when they penetrate into a natural position. Give always as much water as will saturate the soil quite down to the roots, and if it is neglected in burning weather no real Alpine can be expected to thrive long. If judiciously arranged so that the stronger do not smother the weaker, the plants have a wonderfully homely appearance, and pay for a little taste and forethought. Nothing injures an Alpine plant so soon as being over-

grown by its neighbour, and it is well for an amateur, in commencing their culture, to confine all attention to the commoner kinds, and afterwards, when better versed, to add those that require special treatment, so that the collection will ultimately become a thoroughly miscellaneous one, comprising bulbous, tuberous-rooted, and creeping herbaceous plants, each imparting its share of beauty and variety all the year round.

Appended are two lists likely to be of service to those who contemplate the formation of such a garden :

A SELECTION OF CLOSE-GROWING ROCK GARDEN PLANTS NOT EXCEEDING SIX INCHES IN HEIGHT, ARRANGED FOR A CONTINUOUS DISPLAY OF BRIGHT FLOWERS OR CURIOUS FOLIAGE FROM SPRING TO AUTUMN. COMPLETE LISTS OF THE SPECIES AVAILABLE "IN VARIETY" SHOULD BE PROCURED FROM NURSERVMEN MAKING A SPECIALITY OF THIS CLASS OF PLANTS :

Name.	Height.	Colour.	Flowering months.
<i>Acantholinum glumaceum</i>	... 3in.	... pink	... 5 to 6
<i>Æthionema cordifolia</i> ...	... 4in.	... rose ...	... 7 to 9
<i>Androsace carnea</i> ...	... 3in.	... pink	... 5 to 6
<i>Anemone appenina blanda</i>	... 3in.	... blue...	... 4 to 5
<i>Arenaria Balearica</i> ...	... 2in.	... white	... 5 to 7
<i>Aster stellaris</i> ...	... 6in.	... purple	... 6 to 8
<i>Aubretia græca</i> ...	... 6in.	... purple	... 3 to 5
<i>Campanula muralis</i> ...	... 6in.	... blue and white	... 6 to 8
<i>Dodecatheon splendidum</i>	... 6in.	... crimson	... 5
<i>Draba azoides</i> ...	... 3in.	... yellow	... 4 to 5
<i>Gentiana</i> ...	... 3in.	... blue...	... 4 to 6
<i>Edelweiss</i> ...	... 6in.	... dove	... 5 to 8
<i>Helianthemum (Rock Rose)</i>	... 6in.	... various	... 5 to 7
<i>Hutchinsia alpina</i> ...	... 3in.	... white	... 3 to 5
<i>Linaria pallida</i> ...	... 6in.	... purple	... 5 to 8
<i>Lithospermum prostratum</i>	... 6in.	... blue...	... 5 to 7
<i>Lychnis alpina</i> ...	... 4in.	... pink	... 6 to 8
<i>Morisia hypognæ</i> ...	... 3in.	... yellow	... 6 to 8
<i>Phlox setacea</i> , in variety ...	... 4in.	... various	... 5 to 7
<i>Primula</i> , in variety ...	2 to 6 in.	... various	... 3 to 6
<i>Saxifraga</i> , in variety ...	3 to 6 in.	... various	... 3 to 6
<i>Sedum</i> , in variety ...	2 to 6 in.	... various	... 6 to 8
<i>Sempervivum</i> , in variety ...	2 to 4 in.	... various	... 6 to 8
<i>Silene</i> , in variety ...	3 to 6 in.	... various	... 5 to 8
<i>Veronica rupestris</i> ...	... 3in.	... blue...	... 5 to 7

A SELECTION OF BULBOUS OR TUBEROUS-ROOTED PLANTS OF DWARF HABIT SUITABLE IN ROCK GARDENS FOR BLOOMING IN WINTER AND SPRING, ALL OBTAINABLE IN A DRY OR DORMANT STATE IN THE AUTUMN:

Name.	Height.	Colour.	Flowering months.
Aconite	4in.	yellow	2 to 3
Anemone, in variety	9in.	various	4 to 6
Chionodoxa	6in.	blue...	2
Calochortus, in variety	9in.	various	5 to 6
Crocus, in variety	6in.	various	2 to 4
Cyclamen, in variety	6in.	white or pink	3 to 5
Erythronium, in variety	9in.	various	4 to 5
Fritillaria, in variety	9in.	various	3 to 5
Galanthus (Snowdrop)	6in.	white	2 to 3
Iris, in variety	9in.	various	2 to 5
Muscari, in variety	9in.	blue and white	4 to 5
Narcissus, in variety	9in.	yellow and white...	3 to 4
Scilla, in variety	6in.	white and blue	2 to 3
Sisyrinchium	9in.	purple	5 to 7
Triteleia	6in.	light blue	3 to 4
Trillium, in variety	9in.	white and pink	4 to 6



Snowdrops, Aconites, and Scillas.

ORCHIDS OF EASY CULTURE.

Science informs us that though there were gigantic mosses and ferns in the earliest period of the earth's existence, there were no bright or beautiful flowers until the era of humanity. Since those times the flora of the universe has become the constant associate of mankind, and we now find flowers the object of luxury and ornament in every direction. In our northern latitudes some trees are covered with a dull lichenous growth, whilst in the glowing regions of the tropics they are teeming with plants called orchids, bearing flowers of the most fantastic shapes and gorgeous hues, and it is delightful to contemplate that these lovely denizens of sunnier climes make themselves amenable to culture in our greenhouses and conservatories.

From this introduction it will be gathered that orchids, in their natural habitats, are found clinging to the trunks or limbs of trees, or on rocks and stones, where they make their home, thrive under varying degrees of heat and moisture, and embrace a surprising range of floral variation in form and colour. They are generally considered a "rich man's flower," and the very breath of the word orchid causes the amateur gardener to heave a deep sigh, and his thoughts soar into the region of millionaires. He has been educated to this deplorable state by sensational paragraphs he has seen in print, and steadfastly believes they are quite beyond the scope of his purse and surroundings. First of all, let us dispel the prevailing opinion that all orchids must be grown in very hot houses especially constructed for their reception, for there are species that are hardy, and may be grown by anyone possessing a bit of garden, either in the country or in the suburbs of our cities and towns, where there is a fairly clear atmosphere. Then there are what are known as cool-house orchids, those which can be grown in an easy temperature amongst the miscellaneous collection of flowering plants generally found in an amateur's conservatory or greenhouse. It is not due to successful acclimatisation that these will thrive in a cool temperature, but because their natural habitats are found in the higher mountain ranges where the climate is temperate. The chief points in orchid culture are plenty of light, free breathing space, with judgment in ventilation and heat, good rain water, and a blind over the house during the strongest sunshine hours of summer. Orchids, like every other plant, are subject

to disease, but they are very tenacious to life, and it generally takes a good deal to kill these cool-house species.

When orchids were first brought here, and, indeed, for many years afterwards, little was known of their physical or climatic habits, and rarely were they successful, even in professional hands. Those from the higher regions of the Himalayas or Andes were treated under the same conditions as importations from the swamps of tropical forests, with the result that thousands of the more delicate species perished from the effects of erratic treatment.

Next comes the question: What is the best to grow? And this is an important matter. By far the better plan is for a beginner to commence with the cool-house kinds, as these are the easiest to cultivate, and very showy when in flower. I have prepared a list of some of the most beautiful, which come within the scope of this chapter. The season of the year which is stated as the flowering period must be taken as an average, as it varies somewhat, according to treatment and surroundings.

Name	Flowering period.	Colour.	Treatment.
<i>Cattleya citrina</i>	Winter	Yellow	On a block.
<i>Cattleya Trianæ</i>	Winter	Rose and white	Pot or basket.
<i>Cœlogyne cristata</i>	Spring	White and yellow ...	Pot or pan.
<i>Cypripedium insigne</i>	Winter	Yellow and brown ..	Pot or pan.
<i>Cypripedium Sedeni</i>	Autumn	Rose-pink	Pot or basket.
<i>Cypripedium villosum</i>	Winter	Brown and yellow ..	Pot or basket.
<i>Denrobium nobile</i>	Spring	Crimson rose	Pot or basket.
<i>Dendrobium chrysotoxum</i>	Winter	Yellow	Pot or basket.
<i>Dendrobium speciosum</i> ...	Spring	Green and white	Pot or basket.
<i>Lælia anceps</i>	Winter	Crimson rose	Pot or basket.
<i>Lycaste Skinneri</i>	Winter	Crimson and white ..	Pot or basket.
<i>Masdevallia Harryana</i>	Spring	Purple and scarlet ..	Pot or basket.
<i>Maxillaria venusta</i>	Spring	White and red	Block or pan.
<i>Odontoglossum citrosum</i> ..	Summer	White	Pot or basket.
<i>Odontoglossum crispum</i> ...	Winter	White and yellow ...	Pot.
<i>Oncidium incurvum</i>	Summer	Rose and white ...	Pot or basket.
<i>Oncidium crispum</i>	Summer	Choc. and yellow ..	Pot or basket.
<i>Oncidium tigrinum</i>	Summer	Chiefly yellow	Pot or basket.
<i>Sophronites grandiflora</i>	Autumn	Scarlet	Block or pan.
<i>Trichopilia suavis</i>	Spring	Rose and white	Block or pan.

With a selection of this kind, most of which can be obtained at prices varying from 1s. to 5s. each, much pleasure, and a certain display of curious flowers may be secured by anyone having a real interest in, and a fair liking for them. The durability of orchid flowers commend them for table decoration; indeed, the plants themselves can be moved about without much fear of injury, and the blossoms often live a very long time—in some cases as much as three months elapse before their beauty fades.

Orchids are easily grown if a few cardinal points be observed. When the plant begins to grow, which is generally in the spring and summer, varying in different species, the supply of water should be increased, also the temperature. As soon as the growth is completed the plants should gradually receive more air and less water to enable them to ripen off well, and thus ensure good flowering. After the growth has matured, then only enough water should be given to prevent the flowers from shrivelling up if they are out.

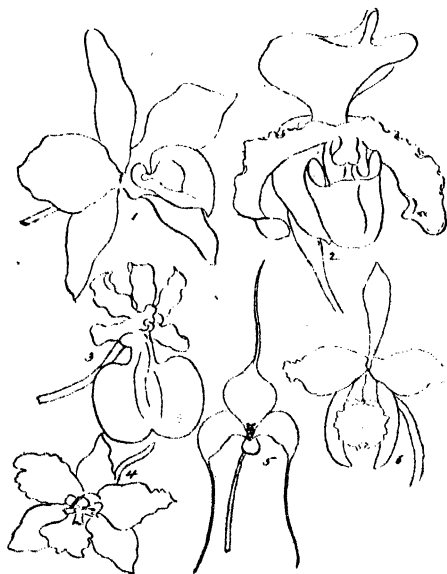
After the flowering season is over, then they should receive any potting or re-basketing if needed. The best potting material is good fibrous peat and clean sphagnum moss with plenty of crocks intermixed. Good drainage should be provided, and the plants well elevated above the rim of the pots or baskets. In repotting, care should be taken not to disturb the roots; rather break the old pot, while the basket can be set into a larger one and some material worked around. With these general cultural directions any novice will be able to grow orchids without difficulty and reap a rich harvest of their beautiful blossoms.

There is no fixed rule with regard to the application of water to the root, and it may be taken for granted when the plants are growing freely a fresh supply is required if the soil feels at all dry. Overdosing will rot the roots. Those growing on blocks should be dipped in a pail of tepid water, say three times a week, if hot; but not as often if weather is dull; in winter about once a month is sufficient.

The temperature from March to September should range from 55deg. to 70deg., October to February, 45deg. to 55deg. Keep

moist in summer, and water little when dormant in winter. The flowers last much longer if kept in a dry atmosphere while out. Receptacles necessary are pots, pans, baskets and wood blocks, fibrous peat soil and sphagnum moss—all these are procurable from nurserymen who make orchids a speciality.

It should be understood that the prices which some orchids command are regulated more by novel forms and markings than by the beauty of the flowers, so that cost does not necessarily afford an index of their value as decorative plants. Another important feature in orchid-growing consists in the fact that the plants increase in value in proportion to the size, and when well grown and in a healthy condition will often pay a liberal percentage on the outlay.



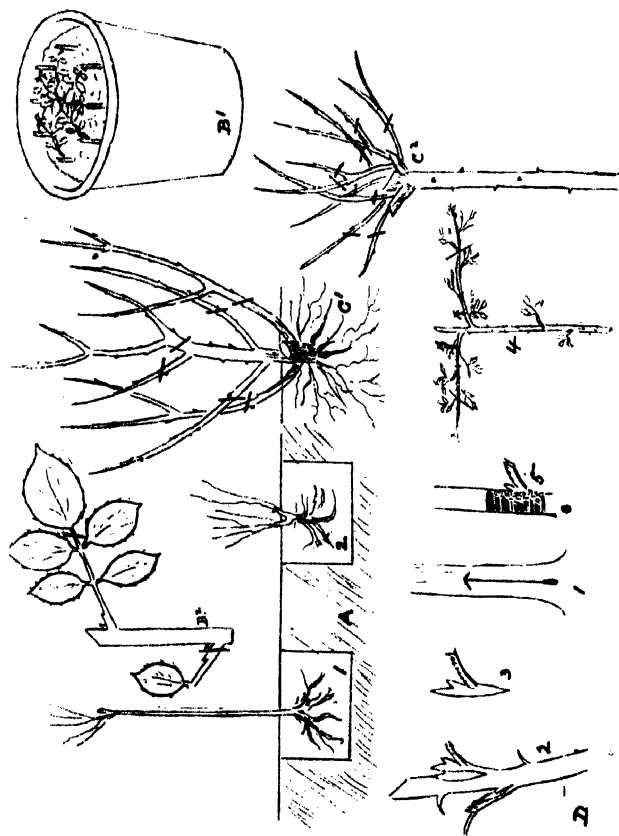
Types of Orchid Flowers.

- 1.—*Dendrobium*. 2.—*Cypripedium*. 3.—*Oncidium*. 4.—*Odontoglossum*
5.—*Masdevallia*. 6.—*Cattleya*.

ALL ABOUT ROSES.

A rose garden is almost indispensable, either as forming a part of, or an adjunct to, that portion devoted to flowers, and nowadays we find this delightful favourite cultivated in all directions, and it is charming everywhere. A flower to hold chief rank amongst its compeers for so many years must possess a greater share of valuable qualities than any other, and this is the position that has been occupied by the rose in all ages. It is universally admired for its beauty, which remains from the instant the bud is formed until the last stage of full bloom. It creeps, hangs, and climbs, and from the darkest days of the winter to the brightest of summer is available under various systems of culture, in an endless number of types and lovely tints. Beautiful it is whether displayed upon the tall standard or the bushy shrub, or alone amidst a wealth of foliage, and among a thousand other showy companions. Its fragrance is often delicate and enchanting, and even when the petals fall they are collected on account of the subtle perfume retained. In method of living it not only flourishes upon its own roots in gardens, but when budded on the wild rose of the hedges it grows to perfection, and, treated as a wildling, thrives in uncongenial surroundings, and assumes the most fantastic growths.

There are many different classes of roses, but those most popular for outdoor culture in this country are the hybrid perpetuals, notable for their sturdy habit of growth, great variation in colour and adaptability of thriving in less favourable places than others. The tea and noisette species are noted for their fragrance and usefulness in the bud form. In warm and sheltered situations many will thrive out of doors, but this class is generally grown under glass. Then there are the climbing and pillar roses, all showy and effective, and the moss rose is very pretty, though not grown nearly so much as it deserves. There are also the old-fashioned Provence and rambling species, and we must not omit the sweet briar and the newer hybrids lately introduced. If the inquirer knows but little about the various sections it is better to go



A.—How to plant roses. 1.—Standard. 2.—Dwarf. B.—How to put cuttings in a pot. 2.—Rose cutting. C.—How to put a cutting in a pot. D.—How to slice a bud. 1.—Cut for bud to be inserted. 2.—Bud on matured growth. 3.—Bud ready. 4.—Showing place on standard brier where to be inserted. The bars show where growth of brier is to be cut off. 5.—Bud inserted and bound round with bass.

to a respectable nurseryman, give all particulars as to soil and situation, and leave the selection to him, stating whether any special colour or types are desired, and giving any other information likely to be useful for the supplier's guidance.

Those who have properly-constructed houses may increase their stock at almost any time of year by cuttings, budding, or grafting, see illustration, page 140, but those who have only ordinary frames, or who have to depend on outdoor culture, must do so at certain seasons. If by cuttings, April and September are the best months, and if inserted in sandy soil in a shady place, they will readily take root. Eyes may also be grown round a pot, as shown in the illustration. The soil must be half sand, and the cuttings pressed in up to the leaf. Grafting is performed in spring, and budding in July on the wild briar for standards, whilst for those dwarfs that are not grown upon their own roots, a species called "Manetti" is commonly used as the root stock. In the custom now prevailing of growing roses upon the root of some other type, it sometimes happens that a stem from the rootstock is permitted unknowingly to grow up. This should be watched for and cut out as soon as it appears.

A position facing south, with plenty of pure air, a moist climate, quite in the open, and as far as possible away from the roots of large trees will be found to answer best for roses.

In a report recently issued by the National Rose Society of an examination made of several soils known to produce good roses, their analytical botanist came to the conclusion that the best results are to be attributed to natural conditions in local climatic influences, aspect, and good drainage, rather than to any special features in the actual composition of the soil. However, for our purpose, a strong loam is recommended, not less than 2 feet deep if clay is underneath, but if gravelly the root-bed should be a foot deeper. An unfavourable soil should never deter lovers of roses from entering upon their cultivation, and the best plan is to find out the kinds that are known to succeed in the district. Very wet soils must be drained, as roses will not flourish in or near swampy ground. The worst soil of all is a hungry gravel, but this can be remedied if specially prepared beds are made for the roots.

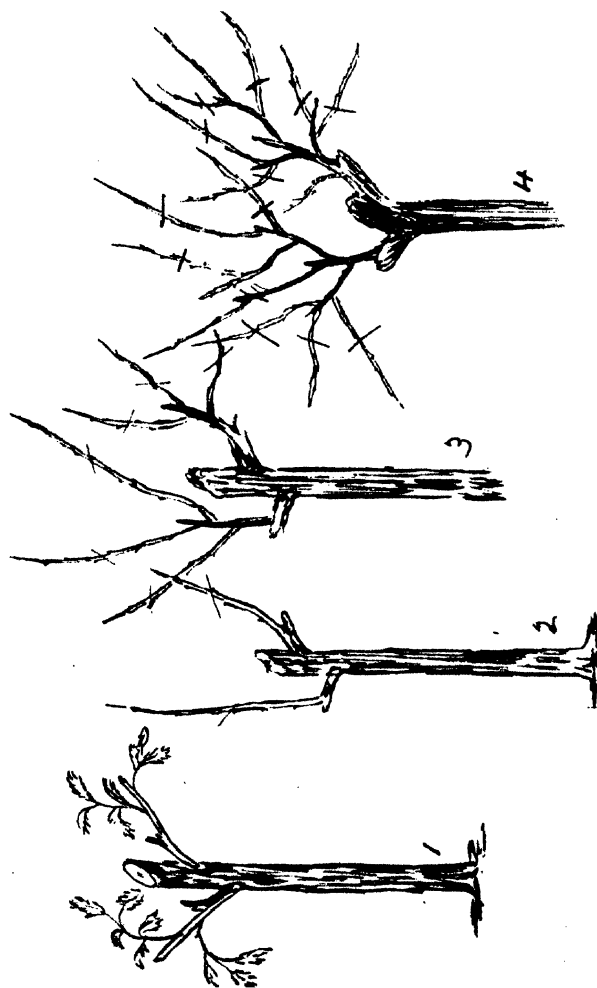
Old stable manure is a good dressing upon heavy soils, and cow-dung upon light soils; these stimulators should be dug in under the surface during spring, to induce growths after the trees have been pruned. Of the artificial manures, guano is the best, but if over-dosed the flowers will be coarse and ill-formed. Old cesspool manure, mixed with lime, ashes, and loam, the latter to be as four to one in quantity, makes a capital dressing, but must not be applied until mixed and turned over several times, say for a month. In anticipation of the hot summer months a good covering of well-rotted manure, hidden with a sprinkling of soil, is a great help towards enabling the plants to carry a wealth of blossom.

The autumn is the best season for planting the hardy sorts, but the more tender teas and noisettes should not be put out until spring, as they often suffer severely in a hard winter. When the plants arrive, if they cannot be committed to their permanent quarters immediately, they should be temporarily put into the ground. The roots should on no account be allowed to get dry. Standards should never be closer than 3 feet apart, and dwarfs, 2 feet—in a circular bed the tallest should go in the centre. Those intended for a wall should not be planted nearer than 4 inches to the bricks. Now as to planting roses. Make a large hole, put some manure into the bottom and mix it about in the earth, lay a little specially prepared soil over this, then stand the tree on it carefully, laying out the rootlets so that none of them are twisted or bent under, throw in some more soil, then tread round the roots to make them firm. In strong soils the roots need not be more than 6 inches under the surface, but in a dry soil double this distance is advisable. Stake all standards and choose a dry day, when the soil is easily workable. Dwarf roses should be planted in masses, and the growths after the first year pegged down, when a wealth of blossom may be expected. Climbing roses and other vigorous types of the class that are not pruned back every year require as much root room as can be given. The best soil for pot culture is composed of half clean fibrous loam, one quarter leaf mould, one quarter old manure, with a sprinkling of silver sand. Put plenty of rough material over the crocks, and pot firmly.

It is difficult to advise amateur cultivators how to prune roses, as different sorts require special treatment, and only by experience

of each variety in a particular locality is it discovered exactly under what method of culture it best succeeds. For exhibition purposes again, the system pursued in pruning differs from that when a mass of bloom is desired. To keep roses within a limited area they must be pruned, but if the grower does not understand it the best method to adopt is a little common sense, see illustration, page 140. If the variety produces lengthy shoots these should be shortened a few inches, but if they appear to be too close together, just take one or more of them out. In other varieties that assume a short twiggy growth, the weakest shoots should come out. The pruner should, as far as possible, promote perpetual renewal of the tree, and look to the latest growths for the best display of flowers. With a standard the aim is to maintain a shapely head of useful wood, whereas, if the same variety is grown as a climber, the object is to train the growths to cover the wall or pillar. Where roses have room to ramble little pruning is necessary, except to keep the branches within bounds. The periodical or jobbing gardener is often the worst offender in this direction, being of opinion that the more he cuts the better is the work done, and he hacks and slashes accordingly. It does not always do to prune too severely, nor to assume that every strong grower should be closely cut in, as it frequently happens that if the poor shoots of a weakly plant are closely cropped it assists the formation of a stronger growth too succulent to produce else but leaves. The best season for the operation with outdoor roses is the spring, after the rigours of the winter are over, always commencing with the hardiest varieties in March, and finishing up with the teas and noisettes in April. Dwarf roses are usually cut back the first season to within nine inches of the ground. (See illustration page 140.)

It seems a pity that nearly all the roses one sees in town gardens are standards, and too often these are very weakly specimens, having possibly been brought from some sale-room in a dried-up condition. This, together with the poor class of soil in which they are placed, has caused a sickly and unhealthy appearance. It is rarely that such ill-treated plants ever survive sufficiently to give satisfaction. For the full enjoyment of a plantation of roses they should be legibly and correctly labelled. It does not do to trust to the flimsy ticket attached to the tree when purchased, as this is not intended to stand much wear, and the chances are that the writing is very carelessly done, and will soon wash out. There are



Growth of Budded Standard Roses.

2.—First year.

3.—Second year.

4.—Third year.

1.—Year of budding.

The bars show where to prune.

several very good patent labels supplied by rose-growers, and if fastened loosely, but securely, to the tree, are likely to remain in good condition for years. See page 67.

The worst pest the rose gardener has to contend with is the green fly. It can be got rid of by syringing on warm evenings in early summer with a solution made up as follows:—Boil 2lb. of soft soap in two gallons of water; while still boiling stir in one pint of paraffin, or, if more convenient, one pint of prepared quassia, which can be bought in a liquid form from the chemist. When cool set aside in a suitable receptacle, and a pint mixed with a gallon of rain-water makes a fine application. The rose maggot which eats into the flower-buds, curling the leaf and flower together with a web, needs seeking out and squeezing in the fingers. See page 186.

Now as to the roses which are found to be almost or entirely without prickles. It seems a thousand pities they are discovered, not among the popular types forming the chief decoration of gardens, but among those grown mostly in botanical collections and by expert raisers for the purpose of cross-fertilisation. They are found in the summer flowering type known as Alpine or Boursault roses, a climbing species producing flowers in clusters. Their original habitat is in the Alps and Pyrenees, so that they are quite hardy. Through assuming a pendulous habit they are called weeping roses. In some varieties the young stems are armed with prickles, which drop off as the growth matures. The crimson Boursault came to the writer's garden through being used as a root-stock, upon which a more showy rose was budded. The bushy white rose often seen in cottage gardens, and known by botanists as *rosa alba*, is almost spineless, whilst newer types raised from it are very thorny. *Rosa multiflora*, a climbing species from the East, bears flowers in large corymbs, has elegant foliage, and a trace only of spines, whilst *rosa microphylla*, a native of the Himalayas, and known as the small-leaved rose, is destitute of prickles on the stem, but densely covered on the cup which holds the petals.

Here is a selection of roses that are not very prickly:—

François Michelon (H.P.), deep rose, the reverse of petals silvery.

Paul Neyron (H.P.), bright rose.

Marchioness of Londonderry (H.P.), ivory white.

Beauty of Waltham (H.P.), rosy crimson.

Charles Lefebvre (H.P.), velvety crimson
 Countess of Oxford (H.P.), carmine with violet shade.
 Duke of Fife (H.P.), deep crimson scarlet.
 Etienne Levet (H.P.), carmine rose.
 Pride of Waltham (H.P.), salmon pink.
 Suzanne Marie Rodocanachi (H.P.), rich rose.
 Ulrich Brunner (H.P.), cherry red.
 John Hopper (H.P.), light rose.
 Crimson Bedder (H.P.), crimson.
 Madame Plantier (B.), white.
 Captain Christy (H.T.), rich flesh.
 Aimée Vibert (N.), pure white.

The National Rose Society recommend the following selections of roses for ordinary decorative purposes in gardens. They are all free and healthy growers, and likely to give every satisfaction when cultivated under favourable conditions:—

ROSES FOR STANDARDS.

Augustine Guinoisseau (H.T.), blush white.
 Baroness Rothschild (H.P.), pink.
 Bouquet d'Or (T.), rich yellow.
 Caroline Testout (H.T.), salmon pink.
 Dr. Andry (H.P.), bright crimson.
 Duke of Edinburgh (H.P.), scarlet crimson.
 Dupuy Jamain (H.P.), bright cerise.
 Gloire de Dijon (T.), buff yellow.
 La France (H.T.), silvery rose.
 Mme. Bérard (T.), fawn yellow.
 Mme. Lambard (T.), salmon shaded rose.
 Marie Van Houtte (T.), yellow-edged rose.
 Mrs. R. G. Sharman Crawford (H.P.), rosy pink.
 Souvenir de S. A. Prince (T.), white.
 Ulrich Brunner (H.P.), cherry red.
 Viscountess Folkestone (H.T.), flesh.
 White Maman Cochet (T.), white tinged lemon.
 William Allen Richardson (N.), orange yellow.

BEDDING ROSES.

Augustine Guinoisseau (H.T.), blush white.
 Captain Christy (H.T.), flesh.
 Caroline Testout (H.T.), salmon pink.
 Dr. Grill (T.), coppery rose.
 Francisca Krüger (T.), coppery yellow.
 Général Jacqueminot (H.P.), scarlet crimson.

G. Nabonnand (T.), flesh shaded rose.
 Hon. Edith Gifford (T.), pale flesh.
 Laurette Messimy (C.), rose-yellow base.
 La France (H.T.), silvery rose.
 Mme. Hoste (T.), pale yellow.
 Mme. Lambard (T.), salmon shaded rose.
 Marie Van Houtte (T.), yellow edged rose.
 Marquise de Salisbury (H.T.), bright crimson.
 Mrs. R. G. Sharman Crawford (H.P.), rosy pink.
 Mrs. W. J. Grant (H.T.), bright pink.
 Princesse de Sagan (T.), deep cherry red.
 Viscountess Folkestone (H.T.), flesh.

12 ROSES FOR ARCHES.

Aimée Vibert (N.), pure white.
 Bouquet d'Or (T.), dark yellow.
 Claire Jacquier (Cl. Poly.), nankeen yellow.
 Dundee Rambler (Ayr.), white, pink edge.
 Félicité Perpétue (Evergreen), cream white.
 Flora (Evergreen), bright rose.
 Gloire de Dijon (T.), buff yellow.
 Longworth Rambler (H.T.), light crimson.
 Reine Olga de Wurtemberg (H.T.), light crimson.
 The Garland (H.C.), blush white.
 Crimson Rambler (Cl. Poly.), bright crimson
 William Allen Richardson (N.), orange yellow.

18 HYBRID PERPETUALS FOR EXHIBITION.

A. K. Williams.	Helen Keller.
Alfred Colomb.	Her Majesty.
Captain Hayward.	Horace Vernet.
Charles Lefebvre.	Marie Baumann.
Comte de Raimbaud.	Merveille de Lyon.
Duke of Wellington.	Mrs. John Laing.
Etienne Levet.	Mrs. R. G. Sharman Crawford.
Francois Michelin.	Prince Arthur.
Gustave Piganeau.	Suzanne M. Rodocanachi.

12 PILLAR ROSES.

Alistair Stella Gray (N.).	Paul's Carmine Pillar (S.).
Bardou Job (H.T.).	Purity (H.B.).
Bennett's Seedling (Ayr.).	Reine Marie Henriette (H.T.).
Bouquet d'Or (T.).	Turner's Crimson Rambler (Cl. Poly.).
Céline Forestier (N.).	
Gloire de Margottin (H.P.).	William Allen Richardson (N.).
Papillon (T.).	

12 TEAS AND NOISETTES FOR EXHIBITION.

Bridesmaid.	Maréchal Niel (N.).
Catherine Mermet.	Muriel Grahame.
Comtesse de Nadaillac.	Souvenir d'Elise Vardon.
Innocente Pirola (T.).	Souvenir de S. A. Prince.
Mme. Cusin.	The Bride.
Maman Cochet.	White Maman Cochet.

24 ROSES FOR POT CULTURE.

Anna Olivier (T.).	Mrs. John Laing (H.P.).
Bridesmaid (T.).	Mrs. R. G. Sharman Crawford
Captain Hayward (H.P.).	(H.P.).
Caroline Testout (H.T.).	Mrs. W. J. Grant (H.T.).
Général Jacqueminot (H.P.).	Niphotos (T.).
Innocente Pirola (T.).	Perle des Jardins (T.).
La France (H.T.).	Souvenir de S. A. Prince (T.).
Mme. de Watteville (T.).	Souvenir d'un Ami (T.).
Mme. Hoste (T.).	Sunrise (T.).
Mme. Lambard (T.).	The Bride (T.).
Maréchal Niel (N.).	Ulrich Brunner (H.P.).
Marie Van Houtte (T.).	Viscountess Folkestone (H.T.).
Merveille de Lyon (H.P.).	

12 CLIMBING ROSES FOR WALLS.

Belle Lyonnaise (T.).	Maréchal Niel (N.).
Climbing Niphotos (T.).	Monsieur Desir (H.T.).
Gloire de Dijon (T.).	Reine Marie Henriette (H.T.).
Longworth Rambler (H.T.).	Reine Olga de Wurtemberg (H.T.).
Mme. Alfred Carrière (H.N.).	Rêve d'Or (N.).
Mme. Bérard (T.).	William Allen Richardson (N.).

The following lists, issued by the National Society have been compiled by the leading amateur and professional rosarians, and represent the best collections where only one is wanted of a particular colour or class:

ROSES WHICH BLOOM BOTH IN THE SUMMER AND AUTUMN.

HYBRID PERPETUALS.

Pink: Mrs. R. G. Sharman-Crawford.
 Rose: Suzanne M. Rodocanachi.
 Cherry red: Ulrich Brunner.

Crimson : Fisher Holmes.

Dark crimson : Prince Camille de Rohan.

HYBRID TEAS.

Creamy white : Viscountess Folkestone.

Rose : Papa Gontier.

Crimson : Bardou Job (almost single).

Pale yellow : Gustave Regis.

BOURBON.

White : Souvenir de la Malmaison.

CHINA.

Pink and Rose : Laurette Messimy.

Crimson : Cramoisie Supérieure.

TEAS AND NOISETTES.

White : Souvenir de S. A. Prince.

Pink : Madame Lambard.

Yellow : Marie Van Houtte.

Coppery red : Souvenir de Catherine Guillot.

POLYANTHA.

White : Madame Anna Marie de Montravel.

Pink : Cecile Brunner.

Yellow : Perle d'Or.

JAPANESE.

White : Rugosa alba (Single), Blanc Double de Coubert.

Rose : Rugosa rubra (Single).

PERPETUAL SCOTCH.

Blush : Stanwell Perpetual.

CLIMBING ROSES.

White : Madame Alfred Carrière (Hybrid Noisette), Aimée Vibert (Noisette).

Crimson : Longworth Rambler (Hybrid Tea).

Yellow : William Allen Richardson (Noisette), Gloire de Dijon (Tea).

**SUMMER FLOWERING ROSES, OR THOSE WHICH BLOOM ONLY
ONCE IN THE YEAR.**

PROVENCE.

Pink : Cabbage or Common.

Moss.

White: Blanche Moreau.

Pink: Common or Old.

DAMASK.

White, striped red: Rosa Mundi.

AUSTRIAN BRIAR.

Coppery red: Austrian Copper.

Yellow: Austrian Yellow.

SWEET BRIAR.

Coppery yellow: Lady Penzance.

Dark crimson: Anne of Gierstein.

White, tipped crimson: Janet's Pride.

White-edged rose: Flora McIvor.

CLIMBING ROSES.

White: Bennett's Seedling (Ayrshire).

Crimson: Crimson Rambler (Climbing Polyantha), Carmine Pillar (single).

Yellow: Claire Jacquier (Climbing Polyantha).

Here is a comprehensive list of roses for buttonholes:—

Duke of Connaught (H.P.), velvet crimson.

Fisher Holmes (H.P.), crimson scarlet.

Crown Prince (H.P.), purple crimson.

Papa Gontier (H.T.), rosy crimson.

Ulrich Brunner (H.P.), cherry red.

A. K. Williams (H.P.), carmine red.

Caroline Testout (H.T.), salmon pink.

Mrs. W. J. Grant (H.T.), rosy pink.

Madame Lambard (H.T.), salmon rose.

Catherine Mermet (T.), light rose.

Pink Moss, pale rose.

Hon. Edith Gifford (T.), flesh white.

Sylph (T.), peach white.

Margaret Dickson (H.P.), white.

W. Allen Richardson (N.), orange and white.

Marie Van Houtte (T.), lemon and rose.

Madame Hoste (T.), lemon yellow.

Anna Olivier (T.), pale buff.

L'Idéal (N.) red and yellow.

Many of these roses flower both at the beginning and end of summer out of doors, whilst under glass culture they provide a buttonhole almost all the year round.

H. P. signifies Hybrid Perpetual; H. T. Hybrid Tea; T. Tea; C. China; N. Noisette
C. P. Climbing Polyantha; Ayr. Ayrshire.

BULBS IN THE GARDEN.

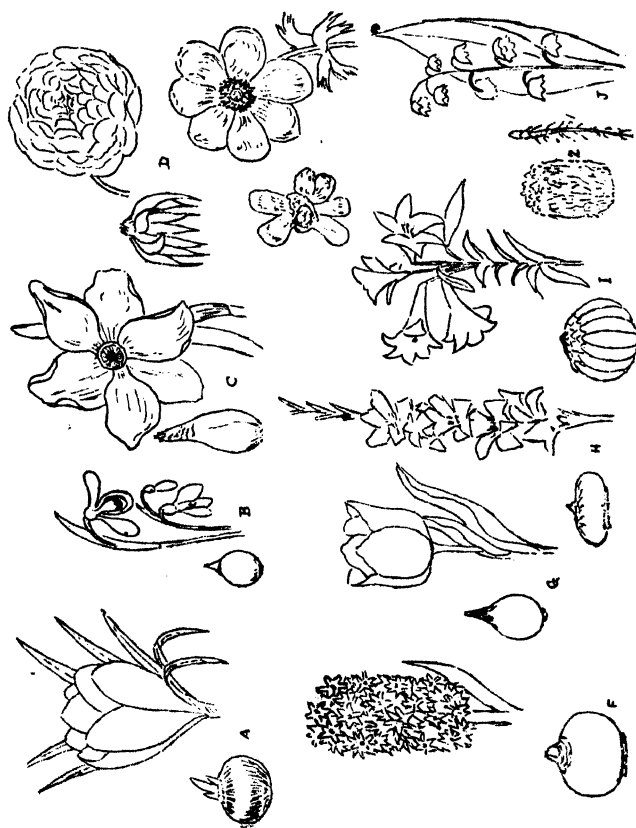
There are many species of hardy bulbous plants that can be put into the ground from September to November to impart life and gay colouring into beds and borders from the turn of the New Year to the end of May, when the summer bedding plants are set out; yet, in the majority of small gardens, no space or consideration is given to this class of easily-grown flowers, so cheap and so readily obtainable. Here is a list by which a display of bloom can be readily effected in a garden bed or border during the first five months of the year, commencing with the latter end of January, according to the weather, with no more trouble than is required from a single planting. Hyacinths and tulips are in themselves beautiful things, yet they only last through April and May, but with the addition of the various bulbous plants named the period is greatly lengthened.

Into the space at command plant the following selection: Such bulbs as hyacinths, tulips, narcissus, and daffodils should be 6 inches apart, crocus 3 inches, and the rest 2 inches—that is to say, many of the small bulbs may be placed between the hyacinths and the tulips if the planter wishes.

Aconites	yellow	To flower in January and February.
Snowdrop	white	
Scilla Siberica	blue	
Chionodoxa	blue and white	
Yellow Crocus	<div style="display: inline-block; vertical-align: middle;"> } </div>	To flower in March and April.
Blue Crocus		
White Crocus		
Daffodils		
Narcissus Ornatus		

NOTE.—The yellow crocus flowers a little earlier than the others.

Hyacinths	various	To flower in April and May.
Tulips (single and Double) ..	various	
Pheasants' Eye and other Narcissus	white & yellow	
Late Tulips	various	
Double White Narcissus ..	<div style="display: inline-block; vertical-align: middle;"> } </div>	To flower in May and early June.
Latest Tulips		



Popular bulbous and tuberous plants.

A.—Crocus. B.—Snowdrop. C.—Narcissus. D.—Ranunculus. E.—Single Anemone.
F.—Hyacinth. G.—Tulip. H.—Gladiolus. I.—Lily. J.—Crown. 1.—Clump.

All should be planted at one level, and when the space is filled about 4 inches depth of soil should represent the top covering. It is a further advantage to add a good lining of cocoanut fibre or some such material on the surface, say, 2 inches in depth; it livens up the place, and acts as a protection against wintry weather; this will gradually rot and become incorporated with the soil.

When the flowering season is over the bulbs, except the hyacinths and tulips, should not be lifted, as they will improve the next year. Before the summer plants are put into these beds and borders it would be advisable to sprinkle over about an inch of rich loam, so that when the plants are being put in they interfere but little with the bulbs in the ground, the leaves and stems of which will be withering away, and should be collected up.

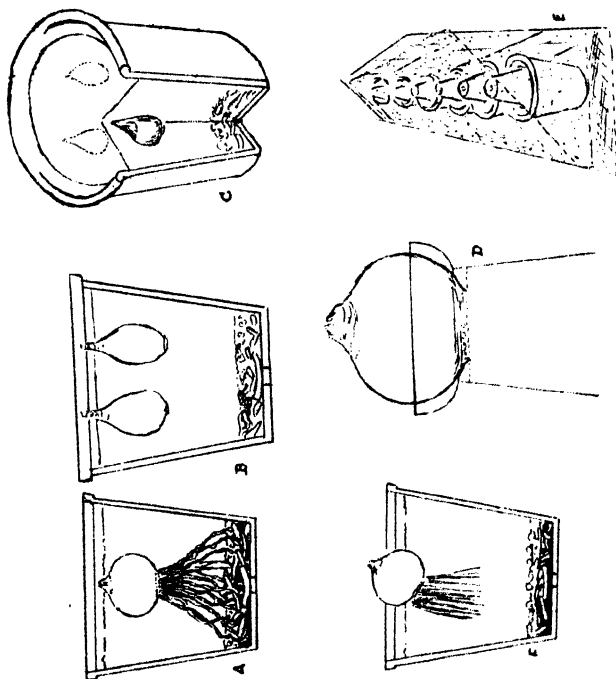
The best season for planting the hyacinth in the open ground is October and November. It does not do to simply make a hole in the soil, push in the bulb, cover it up, and expect a dainty spike of bloom, for when it is borne in mind that it is only a temporary occupant of the position assigned to it, and that all its best beauty is displayed in one season, it deserves, when planting, all the attention that can be bestowed upon it. A bed or border, therefore, that has produced a heavy show of summer-flowering plants needs renovating between the time they are lifted and the planting of the hyacinths. The soil should be loosened and turned over, and a quantity of well-rotted manure incorporated—that taken from an old cucumber or marrow bed is suitable; the whole should then be levelled and made firm. The bulbs should then be put in as follows: If the bed or border is square or oblong it is best to commence at one end, and make a trench the requisite depth, say 4 inches, straight across; into this place the bulbs at the proper intervals, say 6 inches, or if it is intended to plant tulips, daffodils, and narcissus alternately in the row, the bulbs should be put equidistant. When the row is completed, start another trench about 6 inches from the first, filling in the soil taken out into the trench where the first row was planted, and so on until the whole piece of ground is completed; the last trench can be filled up by raking the bed level all over. In the case of a circular bed, it is usual to begin in the centre and work in the same manner in circles, or,

if preferred, in straight lines across the bed ; the centre of the bed should always be a little higher than the sides, as it gives a better effect when full of growth and bloom. In soils of a heavy or retentive nature, the sprinkling of silver sand under the bulb may be found an advantage. Once planted, the hyacinth, out of doors, requires little or no further care, no watering being needed at the season of its growth.

Nothing can equal in brilliancy or richness of colour a bed or border planted with a mass of gorgeous tulips showing their full beauty in the months of April and May. It is one of the most striking in the whole host of garden attractions. Tulips lend themselves for effect in a great number of ways, presenting the most delicate combination of colours when arranged in tasteful design. They will thrive in any good garden soil, and we have seen them planted as late as January and give a splendid result. When placed in beds or borders the bulbs should be put in as recommended for hyacinths ; if poked into a hole made with a dibble they are frequently not a success ; like the hyacinth, no water is needed when bedded out in the open ground. The best merchants state in their directions the height to which the variety grows, which is very useful information to the planter, as it shows him the tall from the dwarf, and he can arrange his plans accordingly.

The daffodil and narcissus delight in a deep loamy soil, and may be successfully grown in situations where many other flowers would perish. They look exceedingly pretty when planted around shrubs or under trees on lawns, on the top of grassy banks, or along woodland walks, or in any position they seem to thrive, improving year by year, under the most adverse influences. So that the bulbs should not be disturbed in beds that are required for summer bedding plants, the bulbs should be planted quite 6 inches down, in clumps, if possible, from 3 to 6 bulbs. They give a far prettier effect in this manner than when arranged in geometrical lines. Note what we say about the hyacinth as to the manner of putting them into the soil, and there is no reason for failure if good bulbs are obtained. The pretty double gardenia flowered variety is the latest to bloom, but it does not always succeed in a dry gravelly soil ; the others seem to thrive under all sorts of conditions.

When bulbous plants have finished flowering in pots they ought



How to treat Bulbs in pots and water.

A.—Hyacinth potted correctly. F.—Hyacinth pushed out of soil by roots because not planted deeply enough. B.—Two narcissus bulbs in a pot. C.—Three tulips in a pot. D.—Hyacinth in glass, water just touching bulb. E.—Pots of bulbs stood against a wall, on ashes, and covered with cocoa-nut fibre.

to be taken care of and eventually planted in the garden, that they may beautify many an unsightly spot another season, and yield abundance of flowers well adapted for use in a cut state, although not sufficiently good to grow on again in pots. Too often they are brought from heated rooms, stood in any out-of-the-way position in the open air, and ultimately thrown on the rubbish-heap. A good way of putting bulbs of this description to a good use is that of planting them in masses under trees, near shrubs, or in front of hedges directly they are over, permitting the foliage to die away naturally. In nearly all private gardens such spots may be found.

It would be difficult to find any plant, wild or cultivated, better able to take care of itself than the crocus, for by planting them deep, say 4 inches to 6 inches, the ordinary preparations for any changes in the beds may be made without disturbing the bulbs, and they will flower year after year, getting stronger each season. In clumps along the front of a mixed border or on green banks they are also very effective, whilst as an edging to beds, planted, say, 4 inches deep and 2 inches apart, they will give a pretty effect for several years. If the different colours are mixed, the flowering period is considerably lengthened. When the bulbs are received late it will be found that they have commenced to sprout. Care must be taken that these shoots are not damaged, or the growth will be delayed and may not produce a flower.



LILIES.

There is probably no branch of floriculture that is attended with so little trouble, in proportion to the pleasure afforded, as the growing of lilies, comprising as they do, so many forms of rare beauty and grace. The family is an extensive one, and noble as well, because no one of its members is unworthy of cultivation. It is true some tender species do not thrive so well as would be liked under any other than special treatment, but it is only of the popular kinds that we are writing.

Lilies of all denominations are considered hardy—in a sense they are, but in general they are not. It is true they will in most cases endure the rigours of our winters and continue to grow the coming season, and may flower fairly well. But to have lilies in the full measure of their beauty and usefulness they must be protected against hard frosts, in order that they may retain unimpaired vitality during winter, which they will do if given an opportunity, and which they must do in order to fully perfect their flowers in summer.

The lily has the reputation of being short-lived, a character which does it great injustice, because it will live long and increase rapidly when carefully cultivated. Although protection is not as essential in summer as in winter, it is necessary to guard against heat and summer drought as it is equally necessary to guard against severe weather. Dry, hot soil will impoverish the bulbs, and prevent increase; therefore, mulch the beds with a thin coating of straw litter or peat fibre. It gives all the assistance needed, and the winter rains dilute the plant food and carry it downward, to be absorbed by the soil, to stimulate energy in the bulbs when they need it in the spring.

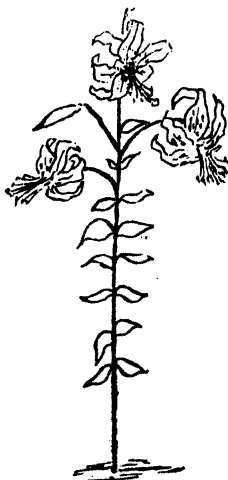
Lilies are very dainty in their choice of fertilisers—peat and leaf mould are acceptable to them, but animal manures, if used at all in their culture, must be disguised by complete decay, or placed

at such a distance from the bulbs that their stimulating properties may not be disagreeably suggestive. If lilies of all denominations are carefully treated this way they will not "run out" after the first season, but, on the contrary, they will rapidly increase in vigour and number. It is a mistake to disturb them frequently. They should thrive for many years in the same soil and place, and much better than if removed annually. When shall we plant? is an oft-repeated question; and to which we would reply, as soon as the bulbs can be obtained. "One lily bulb planted in autumn is worth a dozen planted in spring," we heard an old gardener say once, and my experience has proved the saying to be quite true. The bulbs should not remain long out of the ground, for to be successful they must make new root growth quickly, consequently the sooner planted the better. Some are obtainable in the autumn, others not until the spring.

Most lilies, and especially the golden-rayed queen of them all, *lilium auratum*, love to grow in flickering shade, where sunlight seldom falls upon the roots, while the blossoms, lifted upwards, dance now in sunlight, now in shadow. No lily, however, when exhibiting the full radiancy of its dainty petals, can remain pure and perfect for many hours when fully exposed to a burning sun. For all these reasons the plan of planting lilies among shrubberies commends itself to gardeners who study the needs of this elegant flower. The leaves of the shrubs form a thick and becoming background for the rich and stately blossoms, which have little foliage of their own, and they overshadow the long wand-like stems enough to afford protection from high winds, which might ruthlessly snap them. A still more important consideration is the helpful drainage which the shrub roots give to the soil, for lilies are very impatient of water standing round the bulbs.

The depth for planting different sorts of lilies varies greatly—some species, especially those from America, will not thrive unless planted eight inches deep—but on an average we like to plant lilies about six inches below the surface. There is more art in planting lilies than in simply placing the bulbs right side up. The arrangement of the tall and low growing varieties should be planned carefully, so that replanting will be unnecessary. See that all mutilated or decaying scales are removed before planting, and that the bed is not in a sodden soil.

It often occurs with imported bulbs that by the time they reach the planter they have a dry and withered appearance. Under such circumstances it is positively cruel to pack them into the soil in this limp condition. First of all they should be loosely plunged into some damp material, such as cocoanut-fibre or ashes, and placed in a shady and cool spot for, say a fortnight. It will then be noticed that the scales become plump and stiffened, and in this condition they may be planted as required. They should not be laid in a scooped-out hole, but on a level loosened-up bottom, with some nice friable soil to root into, either singly or in clumps of three to six, each bulb nine inches or so apart, according to sort. Throw in the soil, and lightly press down, until it is level with the surrounding surface. These instructions apply generally to the Japanese lilies, and the speciosum or lancifolium sections, many of which throw out roots from the stem above the bulb, which is one of the reasons why we recommend deep planting both in the open ground and in pots. The white garden lily, which puts forth the early stages of its growth for next season almost before summer has gone, cannot be obtained late in the year in a dormant condition.



Lilium Auratum.

Produces its flowers in August and September out of doors, but can be grown under glass to bloom much earlier.

GLADIOLUS.

Between the best days of the summer bedding plants and the time of the Michaelmas daisy, a continued stream of brightness is ensured by planting bulbs of the hardy gladiolus. Popularly designated sword lilies, their majestic spikes of blossom are objects of real beauty in the open garden late in the summer. Of late years great improvements have been made in this magnificent tribe of plants, and almost every important autumnal flower show exhibits their glorious beauty and variety, which have yielded to the dominion of art, and have alike tended to manifest the skill and perseverance of the expert. The old-fashioned dazzling scarlet, *G. Brenchleyensis*, yet remains as one of the most popular, whilst the newer types of *G. Gandavensis* are marvels of symmetry and elegance, with colours varying from the deepest scarlet through purples and yellows to the purest white.

Various methods of cultivation have been recommended, and the following directions will enable anyone who follows them to grow gladioli successfully:

The situation should be open, and at the same time not too much exposed to violent winds; and, although they like moisture, yet they are very impatient of any stagnant water about the roots. As with many plants, they have a preference for a good deep loam, but unless the soil be a heavy clay, no amateur need be deterred from growing them. Planting may be done at any time during the spring months out of doors, but we prefer from March to April. The rows or clumps should be one foot apart, and the corms (the name of the bulb-like root) should be planted at about the same distance in the rows and six inches deep. They may also be planted singly or in clumps in beds and borders amongst other plants. When the growth is about a foot high, it should be staked. If dry weather sets in, beyond a good watering the growth will require no attention right through the summer.

The bulbs, when received, generally bear a shrivelled appearance, and they should be placed in damp ashes or cocoanut fibre, so that they may swell out before finally planting.

In warm, light soils agreeable to its taste, the bulbs of gladiolus are often left in the ground, and when they become in a year or two established in their situation, their beauty will be realised in all its perfection, and if the circumstances continue favourable they will flower freely for several years. After the decayed stems are cut away in autumn a top dressing of a couple of inches of leaf mould is very helpful.



Gladiolus in flower.

GRASS LAWNS.

What is turf? A definition worthy of a prize was that given by a little London schoolgirl, who, after some hesitation, replied, "Turf is grass and clean dirt stuck together with rain." This child, whose knowledge of a blade of grass was probably gained from the patches in the squares, gave an answer that is good enough to record. If there is one feature more than another that is by everyone considered indispensable to a good garden it is a close verdant sward of grass, and the picturesqueness of many residences is due in no small degree to this stretch of restful green. Even round houses of less pretension well-kept turf improves the appearance of the place. Without it the most elaborately-filled flower beds, the finest trees and shrubs have their beauty heavily and sadly discounted. There are lawns and there are simply grass plots which their owners fondly dignify by that name, but any bit of grass, however small, should look nice; as a lawn in itself is a purely artificial ornamentation, it should be kept as a velvet carpet of vivid green. But there are other recommendations to be urged in favour of the green grass, besides that of mere beauty.

First of all some system of drainage should be adopted, particularly on retentive soils. Cinders, brickbats, lime rubbish, anything of this description answers, yet it is astonishing how successful some lawns are that have never been considered in this respect. Next comes the levelling and consolidating, finishing with a nice surface. The best time for this work is at the end of summer, as it gives a chance for the strongest weeds to be cleared off before the turf or seed is put down.

The old-fashioned way of making a lawn was to lay turf cut from the nearest field, common, or down. Very seldom, indeed, can perfect turf be obtained from such places, for when it is laid on a richer soil the weeds already in it will thrive in increased luxuriance, and are only to be got rid of by persistent attention. The best way of making a perfect lawn is that of growing grass seeds. Seeds sown in April and May quickly germinate if the

weather is moist, and when the growth has speared about two inches high it should be lightly rolled, and, after a week or so, mown, first with a scythe, and after that by the machine, the blade of which should not be set too close to the ground. Though April is usually a good time for sowing, it can be undertaken to the end of May if not too dry, and during August and September on light soils and in sheltered situations. Indeed, in some seasons an autumn-sown lawn is fit to play on by the following summer.

Many newly-formed lawns are ruined from the very commencement because the surface has not been made sufficiently firm. Although it does not need to be as hard as a slab of Portland Stone, it should be so consolidated that when walked over only the slightest impression of the foot is left. It is then scratched with a rake, the seed sown at the rate of 1 lb. or more to a rod of ground, which in a square, measures $5\frac{1}{2}$ yards each way; in some country places this area is called a pole, and in others a perch. Two planks should be laid on the ground, one to stand on, the other to move, and stretches of white cotton set across the ground to guide the sower where to sow. The inexperienced will do well to mix the seed with four times its weight in sifted soil. This assists in securing a more even distribution than when sown alone. Just the same applies to concentrated manures that are put on to give renewed vigour and colour to the grass. After the seed has been sown the surface should be raked in more than one direction, and then well rolled, the tighter the better, or the birds will have a rare feast. Under the influence of genial showers and moderate sunshine the young blades will quickly appear, but they will not move in cold and cheerless weather.

An old lawn should have some sort of a dressing, either of soil of manure, every autumn and spring, because in time it becomes impoverished, and moss and weeds take the place of the true grasses; it has a bad appearance and causes disappointment all round. Often, too, the ground is allowed to get overrun with coarse-leaved plants, such as dandelion, daisy, plantain, buttercup, and yarrow, and these robust interlopers soon assert their authority. Where they have not spread too thickly, there is no more satisfactory plan than hand-weeding. Firstly, then, all weeds must be taken out, not merely cut off at the top, but

spudded out, root and all, and it requires a good deal of perseverance to do it effectually. The operation may give the whole ground an unsightly appearance for a little time, but a fine, clean piece of grass may be looked for later on. Those who tread on a smooth, bright, and springy turf have little thought of the anxious care and watchfulness necessary to keep it in that high state of perfection.

Weeds are indicative of poorness and sterility. Moss also indicates poverty in the soil, and sometimes defective drainage. If grass is not supplied with suitable food it disappears or becomes so weakened that plants of lower orders takes its place. Harrowing or raking lawns has only a temporary effect unless the ground is made more fertile by the addition of suitable manures such as are sold by the seed merchants with full directions. Fresh grasses of fine growth may be sown after deep raking if the soil is enriched by manures. They should be applied and rolled in during dull weather. Although a turf in which clovers prevail is not supposed to "wear" so well as one in which grasses predominate, on most lawns a quantity of small clovers are found, but the presence of this plant is not recommended on either tennis or croquet lawns, as it is so slippery.

It frequently happens that the lawn is already existing, and oftentimes in a most unsatisfactory condition. To improve such a patch it will be necessary to take out the weeds, the end of summer being the best time, only that all must be kept from reproducing seed in the meantime. Sprinkle over some new soil, sow fresh seed at about half the rate already recommended for new lawns, roll it down and let it remain for the winter, and if a good time prevail it may thicken up before winter, any weak places can be given further attention in spring with seeds and manure.

In the case of old lawns, it is a great mistake to allow the grass to remain uncut until quite late, as there is more or less growth made during the winter, and the earlier this is removed in the spring the better appearance the lawn will have, the after-growths being more regular. A large lawn is much benefited by a bush-harrowing during spring, for a smaller one, thorough sweepings with a birch-broom will answer. This will distribute the

worm-casts, and when the operation is completed, the lawn should be thoroughly well rolled. Should there be any patchy places of long grass, use the scythe over them first, then the machine will be able to make better work and form a good foundation for the summer. A neglected lawn may be considerably improved by applying a dressing of rich soil or some stimulating manure. If soil is used it should be passed through a coarse-meshed sieve, and then laid on sufficiently thick to show in the grass. A dressing such as this being washed in by the vernal rains will nourish and increase the grass, and young growth will soon push its way up through the material. All alterations and mendings left unfinished in the autumn must be completed in the spring.

Many gardeners do not realise the fact that this emerald carpet of verdant beauty cannot go on for ever without some kind of cultivation. The growth is continually, year after year, being cut from it, and nothing added to the soil to stimulate the plant, which weakens and wilts under this constant shaving. Consequently, it is an advantage to use some of the advertised artificial manures mixed with the soil. Farmyard manure, though valuable, is often an undesirable dressing, as it invariably contains innumerable seeds of coarse weeds and grasses only waiting for favourable conditions to germinate. Road grit, which is useful on heavy soil, often contains seeds of the vilest wayside weeds, but if these are pulled out when young no great damage can be done. The best grass seeds only should be sown, because cheap mixtures sold by some dealers for lawns are composed entirely of common meadow grasses that are quite unsuitable for a garden lawn.

If grass has become sunken in places, the turf should be cut in the shape of two doors opening outwards. Lay these back, and then add soil so as to bring the grass up to its proper level, relay the turf, water and roll firmly. A contingency that should be specially guarded against in the management of grass turf is that the cutting-knife of the machine should never be set so close to the ground as to pare away the crown of the tuft. Some gardeners, particularly of the jobbing fraternity, never seem happy unless they are constantly cutting away the edge of the lawn to make it even. If the practice be persisted in, the grass will be reduced in breadth and the walk widened. This work should be done with a pair of shears, and the

tips of the overhanging grass only trimmed off. Another ridiculous recommendation is that of leaving the cut grass on the lawn under the supposition that it takes root. The pieces simply dry under the influence of the sun, and look as though a truss of hay had been spilt.

LAWN GRASS SEED.

One pound of grass seed is the smallest quantity recommended to sow a rod, pole, or perch of newly-made ground, this measures in various shapes as follows:

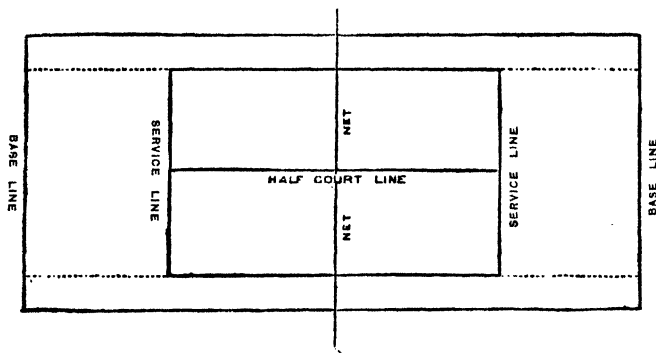
In yards.	In feet.	Square feet.	Feet square.	Square yards.	Yards square.
6 by 5.	18 by 15.	272½.	16½.	30½.	5½.

This area is 160th part of an acre, and a bushel of good lawn grass seed weighs about 25 pounds.

Lawns and other closely-cut stretches of grass suffer in appearance at the end of summer from the depredations of worms, and the question of their use or otherwise in such situations has been raised many times, and it is one on which authorities seem to differ when giving an answer. We are of opinion that worms are placed in the earth to be of service, and without them cultivation on some soil formations would be impossible, whilst on others, operations would be conducted at a great disadvantage. In the first place they assist materially to pulverise the soil by perforating it. They come to the surface periodically for certain essentials, and the holes made in their travels are serviceable in acting as drainage. The stronger the soil is, the more they seem to congregate, and directly they are startled they disappear. Whilst worms may drag a few leaves into their retreats they cause no serious damage to vegetation in a manner such as other pests we could name. They certainly seem out of place on a lawn, but without them the surface would become spongy, more particularly on soils of a tenacious character. Where grass is kept short, their "casts" ejected in the night are both unsightly and troublesome, but there is another view to take. It must be remembered that this earth has passed through the worm and contains valuable manurial properties, consequently if brushed off it should be saved and returned when dried, at a more convenient season. If it is broomed away to some rougher portion of the ground it will be noticed that the grass there will grow with renewed vigour, proving that the worm "casts" contain nourish-

ment, and are worth something better than to be relegated to the rubbish heap. If it is considered necessary to keep worms away from the surface a little lime water is effectual. There is also a poisonous liquid sold for the purpose, which is very efficacious.

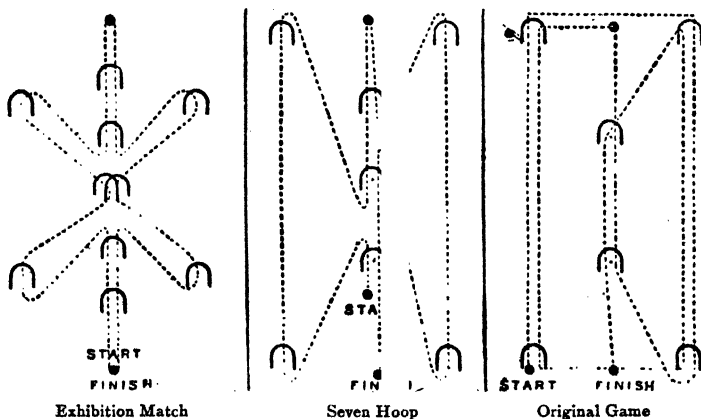
A TENNIS LAWN.



A tennis court should run from north to south. There should be 10 feet, if possible, to spare at either end to allow for running back, with not less than 6 feet at the sides. Having first measured the top line 36 feet, mark off 78 feet from either corner, and test this before going further to ascertain if it will be a perfect oblong; for this purpose the diagonal must be found, which is about 85.91. The thick lines indicate the dimensions of a single court; the dotted ones those of a double court. For a four-handed game the whole of the lines, both dotted and plain, must be marked on the lawn, and the court should measure 78 feet by 36 feet. The single court for two players should measure 78 feet by 27 feet. It is the usual practice, however, to mark the court out for four players, so that it may be used either by two or four. The service lines are 18 feet from the base lines, and connected by the half court line running down the centre of the court, and 42 feet long. The net has to be strung across the centre of the width of the court. The outer side lines used for the double court must be marked $4\frac{1}{2}$ feet

from the side lines of the single court, so as to make the extreme width 36 feet for four players. The outside measurements being now all correct, put a peg into each corner, take a strong piece of string from one end of the court to the other, stretch this very tightly and peg it firmly down, raising the string once or twice in the centre to be sure it falls straight. Then make a white line with the marking machine (running it over once or twice at the most) on

A CROQUET LAWN.



the outside of the string, just touching it. A whitewash brush will do instead of a machine for marking, but the line must be kept thin, straight, and even, whiting lime, with water, being used. The net should be 3 feet high in the centre, and 3 feet 6 inches at the posts, which ought to be 2 feet or 3 feet outside the line to allow of the net dropping.

A full-sized croquet ground should measure forty yards by thirty yards. In a line through the centre of the length of the ground two hoops and two pegs are placed; each peg is put eight yards from the end boundary of a thirty by forty ground, with the central hoops 8 yards apart and 8 yards from the nearest peg. The corner hoops should be in line with the pegs and 7 yards from them. Croquet is often played on smaller grounds, and with the

hoops variously placed, and it is not necessary, except for matches played according to the A.E.C.C. rules, to allow so much space around the actual lines of play.

BOWLING GREENS.—It is necessary that the surface is smooth and level. The finest grasses only should be grown and kept mown and stimulated with suitable manures.

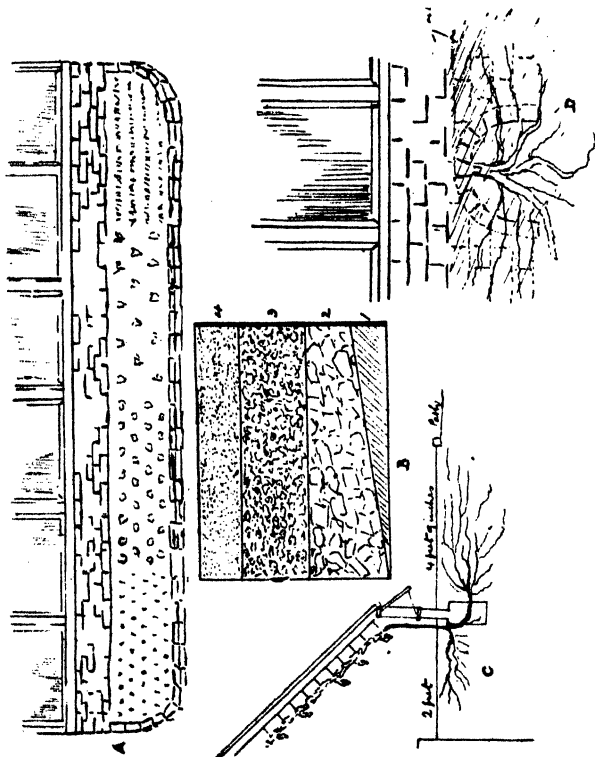
PUTTING GREENS.—Here again the grass should be of the very finest growth. Through the course it is not so necessary, although the herbage should be short and stiff to ensure a good lie.

FOOTBALL GROUNDS.—Here it is advisable to use such grasses as will resist the wear and tear that this hard and fast game gives the grass.

RECREATION GROUNDS.—The grass should be of a short, stiff, wear-resisting species, not necessarily so fine as upon a garden lawn. The same may be said of cricket-grounds, and such-like places of sport.

GRASS SEEDS.

One of the chief reasons why the method of sowing a lawn with grass seeds in place of laying down turf has only recently become popular is because an insufficient quantity of seeds is always recommended. In some careful investigations recently made by competent authorities, it has been proved that the more seed sown within reason, the quicker and closer the result. The old-fashioned idea of making three or four bushels cover one acre might have done for our grandfathers, who did not mind waiting a year or two for results, but to the present-day gardener, who cannot wait, the theory is now exploded.



A.—The front and border of my viney where I grow over 100 bunches of grapes every year on eight canes. The border is utilised for young celery, lettuce and radishes in summer. B.—Shows how this border was made. 1.—The bottom, which is a pebbly gravel. 2.—Twelve inches of brickbats, old bones, lime rubbish. 3.—Nine inches of rough turf soil and manure. 4.—Six inches of fine soil, into which the roots were laid. C.—Side section of viney and border facing south. D.—Showing arches through which roots run into border. The border was made nine years ago, and receives a top dressing of three inches of manure and soil each autumn.

HOW TO GROW GRAPES.

We learn of grapes having been cultivated at the monastic establishments in the earliest records of the country. In these olden days no glass structures were available, and the fruit was grown in the open ground. We next read of vineyards at Hackney, in the valley of the Thames, and in Gloucestershire; whilst at the present day the grape is annually made into wine at the Marquis of Bute's vineyard at Cardiff Castle. With this isolated exception, the grape-vine is mostly grown nowadays under glass for furnishing its delicious bunches of fruit for use at table, and enormous quantities are produced in the leading establishments under systems of culture which ensure ripe fruit at all seasons. In suburban gardens it is the ambition of the occupier to grow a few bunches every year, in some cases in a house specially retained for the purpose, but more often in a glass structure which has also to do duty for many other growing things. A professional gardener scorns the idea of any other plant finding a place in his ranges of glass devoted to the vine, nevertheless the amateur cultivator with his one or two houses for everything often meets with a degree of success that is as astonishing as it is pleasing to himself and friends. The knowledge required to cultivate this delicious fruit is not nearly so great as some authorities would make out, and good grapes may be grown for a few years under what would seem to be most unfavourable circumstances, but if they are expected to remain in a satisfactory condition for a length of time it is very necessary that the border from which the roots must obtain nutriment should be properly made, and the autumn season of the year is a suitable time to undertake the work. The question as to whether the rooting border should be inside or outside the house is often raised, but for the present purpose I unhesitatingly recommend the outside border, which requires much less care and attention, for beyond a liberal surface covering of rich soil during winter and some good soakings of water during the height of summer, little else is needed. The width of the border will vary from 4 feet to 10 feet according to the space at command, and its depth 3 feet near the house, deepening outwards. Into the bottom should be thrown some old brick rubbish, sloping away from the house, so that any excess

of moisture is not likely to settle near the foundations. Over this put a layer of roughly-chopped turfy loam, say a foot deep, and above this the soil into which the roots will ramify (see illustration page 170).

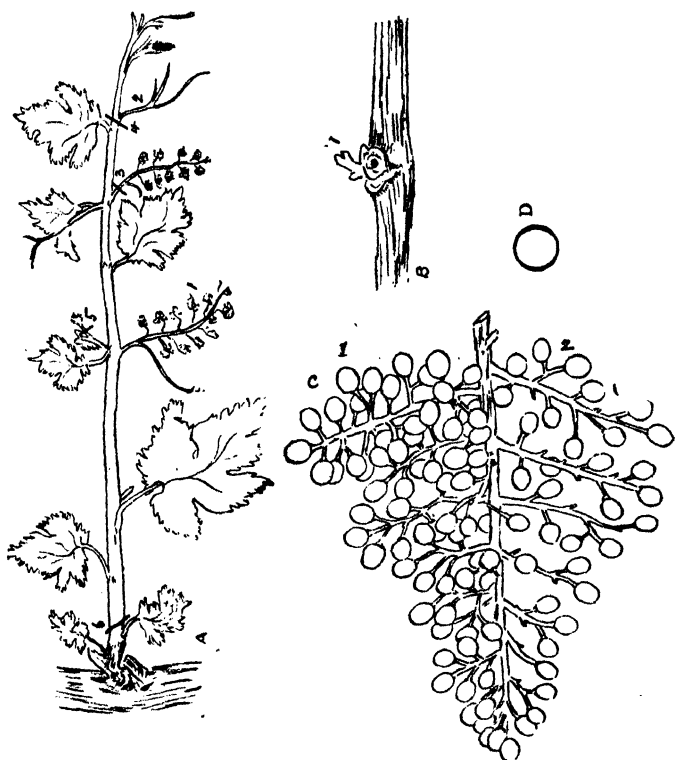
The most suitable compost for the growth of the vine is a good fibry yellow loam taken from the top of an old pasture which has been fed by sheep. To every four cartloads of this soil add one load of lime rubbish, one load of old bones, and a barrowful of fresh soot. Turn the whole over twice before wheeling it on to the border, which should be built up quite 6 inches higher than is intended, as it will gradually sink to the required level in a few weeks; the surface should also slope towards the front rather than remain at a level. It is remarkable the great variety of circumstances under which the vine will thrive, despite the very elaborate instructions that are always given in this connection in some instruction books.

The next thing is the planting, which is an important matter, and requires to be very carefully done, otherwise the roots are apt to get twisted and injured, and from this they would be a long time in recovering. Well-grown rods of a year old are the most preferable to start with; these are called "planting" canes. The best season to procure them from the nurseryman is in the autumn, when the new stock is ready; even if they cannot be put into their permanent positions at the moment it is best to procure them early. When placed in a border they should be shaken clean from the soil of the pot in which they reach the purchaser, so that every root can be laid straight out, and there and then covered with soil to a depth of about 6 inches. It is advisable not to put them deeper, as the sunshine of summer has a beneficial effect upon the little rootlets, which cannot feel its influence when they are planted too deeply down. We will suppose the canes have been planted near the inside wall, and the roots wend their way into the outside border, either through arches in the wall or through specially made outlets, which are much to be preferred to the practice of planting the cane outside and pushing it through a small aperture in the wall. (See illustration page 170.)

The object of pruning is to concentrate the vigour into a compass that can be kept under control, and to induce the utmost

fruiting propensities within a limited area. Pruning vines under ordinary cultivation takes place from December until the end of January, and the sooner it is done the better. We will suppose the canes are planted 6 feet apart; we mention this width as it enables the grower to put in tomatoes, cucumbers, or some such summer crop between them if necessary, but it is not recommended. A planting-cane as received from the nursery is generally from 3 to 6 feet in length; this, when set into that portion of the border which comes, according to circumstances, just outside or inside the wall, should be cut down to the two or three eyes nearest the soil; we give this number of eyes in case of accident. In a position where the stem would be a good way from the light it is as well not to cut the cane so short. As soon as the influence of spring is felt each of these eyes will commence to grow; the weakest should be rubbed off and the remaining two permitted to reach a length of 2 to 3 inches, when the weakest may be taken off, leaving a single growth to be trained up the trellis, and this will form the main stem for after years. Fruit should not be expected the first season, as the plant will require all its strength to get established.

There are two methods of training the vine, in one of which the growth is permitted to extend each season with reasonable stoppings, the other by which the season's growth is cut back yearly to within one or two eyes of the main stem. This latter system calls for greater attention, and is the simplest method to follow in a small house. Although some hundred varieties of the grape-vine are scheduled in catalogues, the number found in large gardens may be said scarcely to exceed a dozen. Most of these are unsuitable for the class of cultivator for whom this note is intended, being either of delicate constitution or intricate growth, which needs the attention of a specialist. The best all-round black grape for constitution, flavour, and certain crop is the Black Hamburgh, and where only one sort is grown this fine variety stands a long way first. The most robust white grape is Foster's Seedling, which ripens earlier than the first-named and requires a lot of room. The next three varieties we will add are the Royal Muscadine, white, hardy, and early; Black Alicante, late; and Muscat of Alexandria, yellow, for situations where the house faces due south, so that plenty of sunshine can play upon the growth, and where artificial heat is available if required.



A.—Main stem of vine showing season's growth. 1.—A bunch of grapes. 2.—A tendril. 3.—A second bunch on the same stem, usually cut off. 4.—The growth is stopped here when the bunch is blooming. 5.—The point of this lateral is pinched out. 6.—When the season's growth has ripened in autumn, and the bunch of grapes has been cut, it is pruned back to here. So that the main stem appears in winter like B, and the following spring's growth will come out of both 1, and the other points; the strongest to be retained. C.—Bunch of grapes. 1.—Not thinned. 2.—Thinned out. D.—The berries are fit for thinning out when about this size.

SPRING TREATMENT.

With the advent of spring, even in vineries where no heat has been given, the buds on established canes soon commence to swell, and as several of these may appear at one joint it is a perplexing question with amateurs to know which to retain and which to do away with. If all are left on a healthy vine its energies must be severely taxed, and if each of them carry bunches of fruit the quantity is certain to affect the quality; consequently, it becomes necessary to remove some of the superfluous buds. It is safest to permit the new growth to extend, say, a couple of inches before deciding which to remove, ultimately leaving one, or not more than two, to a joint (see illustration page 174). Those likely to shoot in opposite directions are the best; the others are easily rubbed off with the finger and thumb at this young stage. Some gardeners recommend that the buds which are closest to the main stem are the best to be retained; others prefer the last bud on the portion of the past season's growth that was not pruned away, and we must say our own experience, from an amateur's standpoint, favours this latter bud, which we have found to be more vigorous than those protruding from the older wood. If the vine is in good health a bunch should show itself about the third or fourth leaf. It has the appearance of a tendril, with little green balls at the end of it. These are the undeveloped flowers which will ultimately produce the grapes. Several may come on one branch, and those that have no show of bloom upon them are cut away, as the branch does not require their support, being tied with soft matting. These tendrils are Nature's device for assisting the branches to cling to whatever comes in the way. In such a situation as we are now discussing they will clutch the wires (see illustration page 174).

The new growth will make its way up to the glass, and the greatest care is necessary in bringing it down to the wires, which must be done gradually, as it is so tender that it will snap off at the base if bent too much at once. The point must on no account touch the glass at this young stage, or it may be so injured as to spoil the embryo bunch. In time the new branches will be more pliable, and, with two or three ties, become level with the wires, and the bunches of flowers will begin to assert themselves and ultimately hang down. Sometimes two bunches are permitted to remain, but we do not recommend overcropping.

Now as to cutting the branches carrying the bunches ; nearly all books say, stop the growth at the second leaf beyond the bunch. I have tried it, and do not find it a success, so I now allow the branch to go ahead until the flower comes out, then I take the point out. Next, say when the bunches begin to fall into a hanging position, I cut the branch back to four leaves beyond the fruit, and when thinning I cut them back to two, and very often leave three. By this method I get over one hundred nice bunches regularly every year from eight vines.

In the case of a first season's vine, the top bud on the cut-down cane is the one usually retained, and during the season it will produce a lengthy growth which should be permitted to go on so long as the point of it is hook-shaped ; but directly it assumes a straight habit it may be reckoned to have completed its work, and then may be shortened, say 6 inches ; this will conserve the strength, and when the leaves fall in autumn may be shortened further back a foot or more, according to its robustness. If any laterals, or side shoots, appear during the summer, they should be carefully taken out, so that the whole energy of the sap may be directed towards thickening the cane, and render it strong enough to carry a few bunches next year. It is not advisable to do all the thinning of the buds and stopping of the shoots on vines at one operation, but a little of both during an interval of days are secrets of success in training.

As to temperature in the spring, on fine mornings a little air may be given about nine, increasing it up to twelve. Reduce it in the same manner until the house is closed about four. The average temperature just now in a house facing south will be from 45deg. at night to 80deg. in the sunshine, but it is better to bring these two extremes nearer together if possible.

SUMMER TREATMENT.

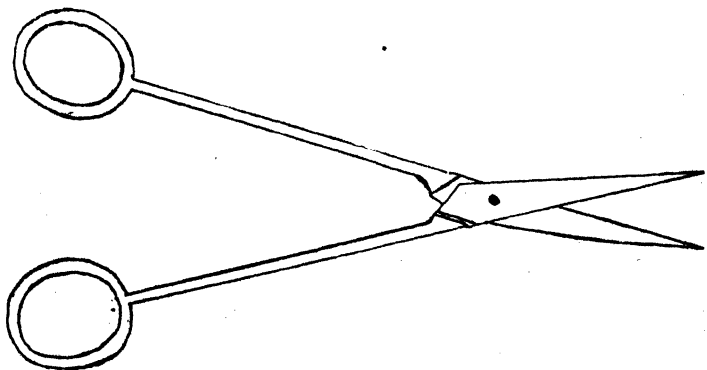
When grapes are grown in the open it is noticed that the fruits in ripening are clustered tightly together, the one hindering the other from swelling to any size. If the same thing happened to those grown under glass, it would seem little use taking the trouble to produce them by artificial means, consequently it is the custom as soon as the berries are as large as small peas, to cut out quite one-third.

The operation requires some judgment, but is very simple after a little experience. The chief points to bear in mind are that, as far as possible, the natural shape of the bunch should be retained, broad shoulders tapering to a point, so that it may look well on the dessert dish when sent to table later on. Then as to the berries which are to come out. It will be seen that some of them are larger than others, the small ones emanating from imperfectly fertilised flowers should be taken out, and all the large and small ones that are inside the bunch, where there cannot possibly be room to swell, must also come out, with any others that almost touch each other on any part of the bunch (see illustration page 174). A professional gardener often takes out quite one-half of the berries, his sole aim being to get enormous individual fruits for his master's table rather than quantity; but for our purpose growers need not resort to such drastic measures, unless desirous of surprising friends by clever methods in culture, and even then they must be sure of correctness in general treatment, as severe thinning alone does not ensure large berries.

The operation in question is performed with grape scissors, specially made for the purpose, and it is best to do the work early in the morning or in the evening when the sun has lost its power. Over-cropping must be avoided, two bunches with perhaps only one leaf between them on a stem is not recommended. The strongest only should be retained, preferably that nearest the main stem, and whilst all young shoots should be stopped, it is not material if the bunches are hidden by leaves from being exposed to the sun, as Nature never intended the grapes to bear the mid-day glare. In a well-regulated vinery the sunlight only pierces through the vernal screen in lines and patches. Quantities of grapes in an amateur's vinery are ruined for the want of ventilation. At the summer season top air should be given before 7 a.m., with graduated front air from 8 to 9 a.m.; close the house about 4.30; but if it directly faces the sun an hour later will do. The floor and staging should be damped down with plenty of water both at opening and closing time, and less air given in dull, cheerless weather, or mildew may show itself. If a hot, dry time prevails a good dosing with water is beneficial to the roots in the outside border about twice a week; but it must be done thoroughly. If the leaves show signs of going yellow it may be through an attack of red-spider on the underside. Get a magnifying glass and examine them.

Scalding is a term used by gardeners to grapes which get burnt by the sun. It is generally brought about in this manner. When the house is syringed in the evening the moisture adheres to the leaves and is also attracted to the berries. Unless air is given early in the morning the sun affects such fruit as it reaches and turns the berry brown and shrivels it. This shows the importance of giving air early to dry it off. With a vinery which faces south, such as mine, I always leave a little top air on all night during the hot season and no harm occurs to the fruit. Shankling is another affection to which grapes are subject when grown in unhealthy surroundings and by incorrect methods.

It may be well to add a word of explanation concerning the phrase "second swelling," freely used by professional writers when discoursing upon grapes. After the berries are set, that is, formed when the flower withers, they swell out with rapidity. As soon as they reach half-size, they seem to stop for a time. The cause of this is the fact that they are stoning, which means that the seeds inside the berries are developing, and while this process of Nature is being accomplished they remain stationary for some weeks, when they start afresh, and stop no more until ripe.

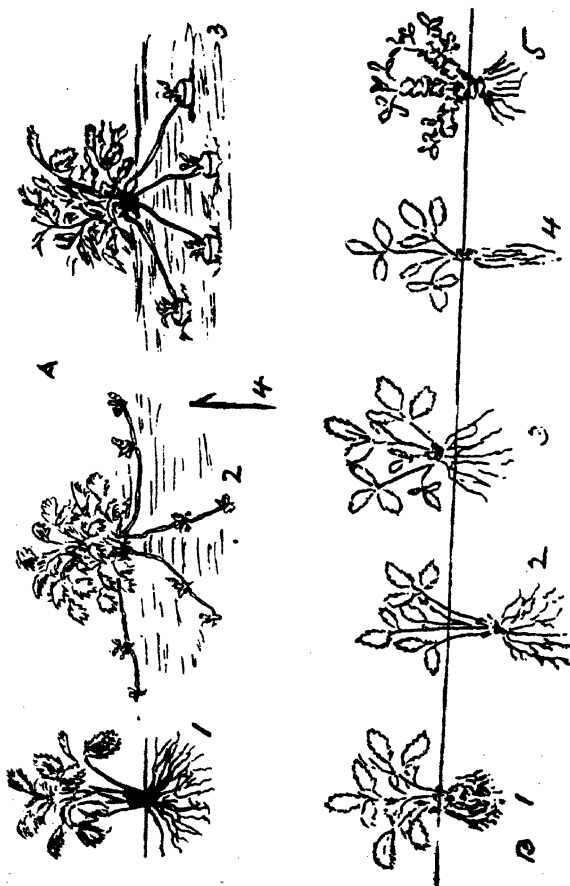


Scissors for thinning grapes.

HOW TO GROW STRAWBERRIES.

Our honoured ancestors, who, no doubt, imagined they had all the good things of this world in their day, patiently groped among thorns in the woods for the few small wild fruits perchance discovered there. Much has happened since those days, yet these simple folks undoubtedly derived as much satisfaction from their rustic gatherings as we do in our gardens with the greatly-improved varieties available.

The strawberry is an accommodating plant, for it is found thriving under most varying conditions of soil and situation, from the burning, tenacious gravels of Kent to the loams of the Grampian Hills. No fruit is so universally relished, and everyone acquiesces in its delicious and palatable merits, whether eaten freshly gathered, mixed with cream, or as a preserve. The best time to eat them is in the cool of the day, before breakfast, when they are full of the sweetness of the morning air, and the nicest way to enjoy them is to gather and eat them from off the plants. Hundreds of acres are grown in the neighbourhood in which these notes are written. Strawberry culture is within the reach of all who possess a garden, and the best month in which to make a new plantation is August, if the rooted plants can be obtained, for during the past few hot summers the runners have not become sufficiently matured for replanting until much later, and as a consequence have not had that opportunity to push along, to reach a sufficiently robust stage for producing fruit the following June and July. When a quick return is desired it is always best to pay a trifle more, and procure plants established in pots, and not as lifted young from the ground, as these latter scarcely get time to mature for a crop the next season. They are usually put out in rows, 15 in. between the plants and 18 in. between the rows. Readers already possessing beds can grow their own runners; these are string-like shoots, with bunches of small leaves at intervals, and grow out of the parent plants at the fruiting season (see illustration, page 180). If not required for reproduction purposes they must be cut away, or they will interfere with the size of the fruit. On the other hand, if required, this is how to manage them: Have a number of small pots filled with light rich soil; set them around the parent plant, pick up a runner, and



Strawberries from various phases.

- A. 1.—A well-established plant. 2.—Showing runners. 3.—Runners being grown in pots for transplanting when ready. 4.—Wood peg used for pressing runners into the soil. 5.—A worn-out plant.
- B. 1.—Plant from a pot. 2.—Planted too deeply. 3.—Not planted deep enough. 4.—Roots cramped up.

lay that portion where the young plant is appearing on the top of the soil in the pot (where there are two, select the more robust); fix it there by either putting a stone on the stem, or, better still, with a wooden peg made in the shape of a pothook from old pea-sticks, and pegged down close to the growth; this will keep it in its place, and is not so cold as a piece of stone. A good watering must now be given, and in a week or two it will become rooted into the pot, and may be cut away from the parent. Plant firmly, with the crown just peeping through the soil, and water well if the weather is dry, and they should soon become sturdy. Strawberry plants that have been forced the previous season are often made to do duty in the garden afterwards, but it seems hardly the thing to expect these overfed and thoroughly exhausted roots to produce such good results as young, healthy runners.

The strawberry gives the best return when grown upon a rich, deep, warmly-situated soil, although in this district the geological structure partakes of a loose, pebbly gravel, which does not seem to contain much nutriment. However this may be, the growers certainly do get very good crops in the fields, and the fruit is both luscious and highly-coloured. It should be borne in mind that the strawberry has been evolved from a wildling, and in imitation of its ancestor prefers pure air and sweet surroundings. Some growers do not recommend any fruit being taken the first year after planting, but advise the whole energy of the plant to be directed to increasing its size. There is some amount of wisdom in this course, but nowadays one's patience gets tired with long waiting.

A strawberry bed will last in full bearing about four years, when its position should be changed, and a new bed formed. Where there is room, it is a good plan to add a few new rows each season. Farmyard manure is considered the best feeding material to put into the soil when preparing the bed, which, after planting, should be kept scrupulously clean. Now, as to sorts, these vary somewhat in different localities, one kind succeeding better in some particular situation than others. As it is best, however, to grow more than one kind, we give a general selection, in which intending cultivators may have confidence:

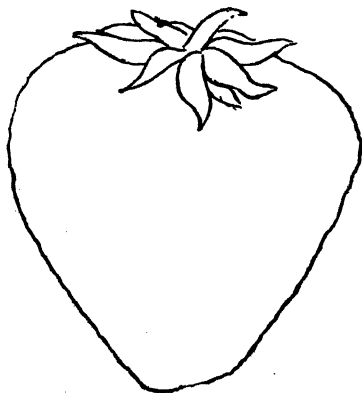
Early.—Keen's Seedling, Royal Sovereign, Vicomtesse de Thury.

Main Crop.—Sir Joseph Paxton, British Queen, President, Dr. Hogg, Sir Charles Napier.

Late.—Waterloo.

Many of the newer varieties are only useful on account of their earliness and fine appearance in the market basket.

After the fruit is taken it is advisable, in the course of a week or two, to go over the plants, cut away all excess of leaves, just loosen the surface, and lay on a good lining of manure to help them through the winter. Deep digging between the rows is not advisable, as it interferes with the roots; besides, the strawberry prefers a firm grasp of the soil rather than to lie in a very loose open texture. Birds and slugs are a source of much trouble in some gardens. The former can be checked by netting, but the latter must be caught by going up the rows at night with a light. Then, again, when a boy is set to keep the birds away, his stomach must be well plied with food, or he will dispose of a far greater quantity than any number of birds. All sorts of methods are recommended for the cultivation of this plant—in boxes, on balconies, round the outsides of tubs with holes in the sides, on rockwork, and many other ways. The best advice is to keep to the garden rows and expect a good return each year without resorting to fanciful cultivations. A crop of winter lettuce may be taken with advantage between the rows of the first season's planting. If put out in September they will be useful until the end of the year.

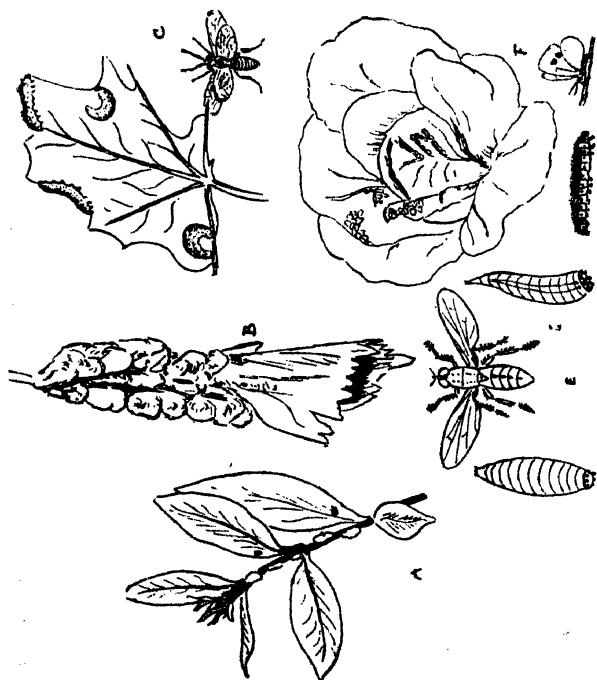


A good type of Strawberry.

GARDEN PESTS.

It is only those who have to do with gardens that can have any idea of the many pests there are to contend with in the cultivation of plants, for, besides numerous crawling insects that live on the surface or beneath the earth, there are many others that take up their abode on the branches or foliage, from which they extract food in some way, and so damage or weaken the plant or tree they infest.

It is during the summer season that vermin commit most of their ravages, and means must therefore be devised by which crops may be defended from the insidious attacks of the insect tribe, some of which, though very minute, and apparently deprived of the means of committing any serious injury, yet are in reality of such a destructive and formidable character as to effect not only the loss of fruit, but damage the plants or trees themselves. One of the most persistent of these insect pests, particularly to the apple tree, is the American blight (see illustration, page 188). It was an importation here over a century ago, and it is now difficult to enter a garden or orchard where its destructive efforts are not evident. Its presence on the bark of the tree may be noted by one or several patches of bluish-white looking fluff, generally on the under side of the branch, or up the main stem. It is very fond of establishing itself in cracks in the bark, especially in places where it has been bruised or eaten away by canker. If rubbed in the fingers it will be seen that the whole mass is alive with insects of the green fly order, but of a dirty brown colour, and living together to all appearances entangled in the fluff. So ruinous have been the ravages of this apparently insignificant insect that there are few pomologists who have not made it their study to devise preparations that will effectually stop the progress of the attack. Lime-washing and brushing the affected part with a hard brush is a system recommended by some, but a great many of the vermin must escape under such a method, whereas they cannot, if their abode is absolutely washed out with a properly prepared composition. We advise readers to look at once to their apple trees, and see if the pest is rampant in their garden, and take immediate steps to check its depredations.



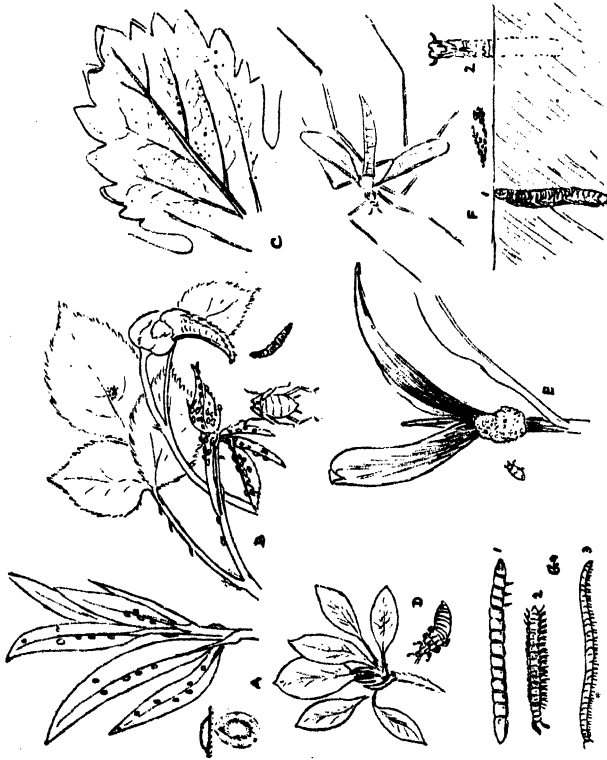
Garden Pests.

A.—Mealy bug on gardenia. B.—Leaf of currant curled up with green fly. C.—Curran saw fly with caterpillar. E.—Onion fly and maggot. F.—Cabbage butterfly, eggs ; and caterpillar.

No policy is so unsatisfactory and expensive as permitting insects to increase and infest plants in thousands, and then commence a war of extermination. The first green fly that is seen in a greenhouse should be the signal for fumigation or dusting; the first aphid of any colour on rose or fruit trees should call forth the syringe. It is surprising what a great insect enemy pure water is, but if this fails, recourse must be had to something stronger. Three ounces of soft-soap, dissolved in a gallon of water, and half a pint of tobacco liquor, made by boiling one ounce of tobacco in two quarts of water, added, will kill all ordinary insects. Small plants in pots should be dipped in it without putting the pot in.

Black fly is a regular torment on nectarine, peach, cherry, and rose trees. With this, as is the case with all other pests, it will always be found that "prevention is better than cure," so make a start early with a powerful syringe, and use one of the advertised compounds. Should the insect still live, make the solution a little stronger, and use plenty of force in applying it. If once allowed to become established on melons or cucumbers in houses or frames the black fly breeds with great rapidity. It is also a terrible pest on broad beans on light soil in dry seasons. The only way to get rid of it is to cut off the tops, where the insect generally congregates, and burn them. When it appears on cabbages they should be sprinkled with salt and water. The wireworm has been doing terrible damage this past few seasons. Owing to the succession of mild winters it has increased without interruption. Soot and salt mixed, so that the soot makes three portions out of four, and sprinkled with care about the crops, will check it, but it is difficult to catch, as it lives in the grub state below the surface (see illustration, page 186). Roughly digging and ridging the ground in autumn, letting it remain through the winter, will get rid of many.

The best preventive against the destructive maggots which attack onions and carrots is to strew fresh soot and pepper over the ground sufficient to discolour it before drawing the drills for reception of the seed, and again later over the growing crop, as the fly is believed to lay its eggs in fissures in the soil caused by the heat of the sun as well as on the plant itself. Carrots sown in July are seldom attacked by the maggot, and onions sown in August will yield a good crop in spring in soil where the maggot invariably destroys



Garden Pests.

A.—Scale on oleander. B.—Green fly and rose maggot. C.—Red spider on vine leaf. D.—Thrip on aralea. E.—Spittle insect on carnation. F.—Daddy long legs. G.—Grub in lawn. H.—Insect coming out of leather jacket. I.—1.—Wireworm. 2.—Centipede. 3.—Millepede.

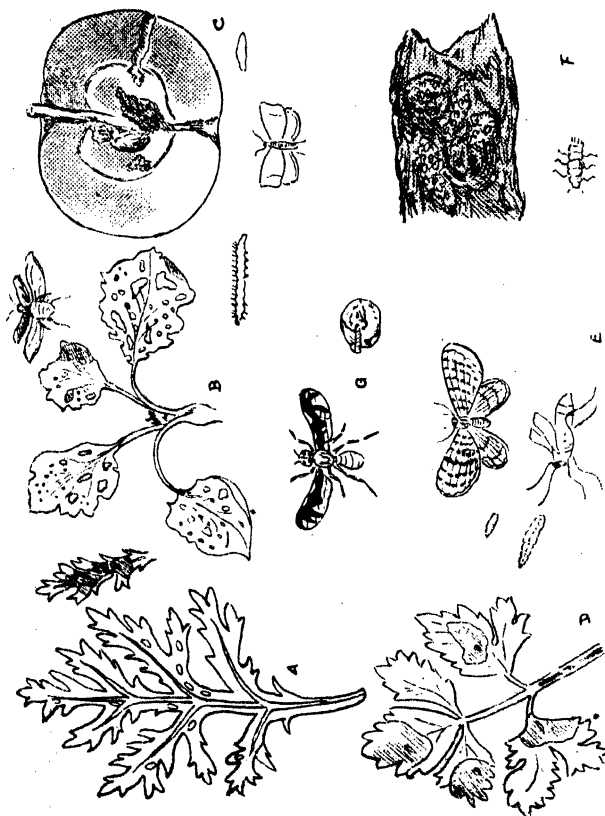
the spring-sown plants. A similar kind of maggot gets into the leaves of young celery, and eats the fleshy part away. Watering the plants and sprinkling with soot will check it. The Marguerite maggot is another of the same order. This must be got rid of by pinching the leaf. (See illustration page 188.)

Thrips are insects frequently the source of considerable trouble to the gardener, especially in a greenhouse. The various species of these pests live mostly at the back of the leaves of plants, and are fearfully difficult to destroy. In cases where azaleas are infested by them, unless prompt steps are taken to dislodge them, they will do a vast amount of damage in a very short time by destroying the leaves and frequently causing the plants to fall away prematurely. Generally speaking, it will be found that these troublesome pests attack plants suffering from want of nourishment and moisture at the roots, and also when in a too-dry atmosphere. Fumigation will, if repeated two or three times, clear away the insects and larvæ, but at the same time leave the eggs untouched. The safest way to effectually destroy insects, larvæ, and eggs, is to either well syringe or dip the plants infested into an insecticide or a safe wash several times with a few days' interval. Given, however, a fairly moist atmosphere, together with frequent and liberal syringing in suitable weather, thrips need not be troublesome at any time. (See page 186.)

The simplest way to get rid of a wasp's nest, if in a suitable place, is to light and insert a penny squib late at night, when they are at home. Then block up the hole. All wasps caught in April and May are queens, or females, and mean the saving of a whole nest later in summer.

Ants in garden paths, and similar places, can be readily destroyed with boiling water poured into their nest. In a greenhouse they can be attracted by a meat bone, and drowned in hot water when it is crowded with them.

The apple caterpillar is bred from an egg laid by a moth on the eye of the fruit when formed. It eats into the apple, and remains there some time. Then the apple falls, and out comes the cater-



Garden Pests.

A.—Marguerite leaf showing grub in tissues. B.—Turnip leaf perforated with fly. C.—One of the apple grubs. D.—Celery leaf showing grub in tissues. E.—Small winter moth, male and female. F.—American blight on apple branch. G.—Grub found in pea-pods with fly.

pillar, and spins a cocoon in some suitable crevice, probably in the stem of the very tree from which it has fallen, and a moth emanates from this in spring, to repeat the performance over again. The remedy is to try and find the chrysalis and destroy it. Washing and cleaning the trunk in autumn and winter goes a good way towards checking this and other fruit tree pests. (See illustration page 188).

The frog hopper, or cuckoo spit, is a common pest, which lives on the stems of flowering plants in summer, encased in a liquid resembling spittle. The only way to get rid of it is to squeeze the insect and kill it. (See illustration page 186.)

The gooseberry caterpillar is a terrible pest in some gardens, and should be caught by shaking the bush after a newspaper has been laid under it. The operation must be repeated two or three times for a day or two. Its presence is soon noticed by the disappearance of the leaves. The soil round the bushes should be well dug over in winter, as the chrysalis which produces the moth lies here until spring. The caterpillar of the magpie moth is equally destructive to currant bushes in early summer. The moth is easily captured on summer evenings. It is black and white with a yellow body.

The white butterfly, which is so common, lays its eggs chiefly on the cabbage plant, and the green caterpillars produced therefrom often quite riddle the leaves, and spoil the plant. They must be caught on the loose leaves and killed. (See illustration page 184.)

There is another little black pest that affects cabbage, which hops like a flea when touched. Salt water will check the depredations of this pest, and do the cabbage good.

The winter moth is the means of a good deal of damage to fruit trees. It lays its eggs in the early winter on the tree, and the caterpillar comes out just as the leaves and blossoms are expanding, and spoils much of them. These drop to the ground later on and become chrysalis, and bury themselves in the soil under the tree. The moth emerges in autumn, and makes for the tree. As the

female moth cannot fly, the remedy is to keep her from getting up into the tree by putting a greasy band round it, into which she sticks, and may be captured. (See illustration page 188.)

The crane fly, or daddy long legs, is a pest on lawns. Its method of breeding is clearly shown in our illustration, page 186. The black shiny eggs are stuck into the ground in autumn, and produce a grub called a leather jacket, which seems to remain in one place until the end of the following summer, when a matured fly works itself out of it, and leaves the leather jacket sticking up in the grass. The best plan to check the depredations of this creature is to catch all the flies when on the lawn in the late summer and autumn months. Encourage all the starlings in the neighbourhood to visit the lawn at early morn during the spring, and in early summer sprinkle a mixture of nitrate of soda and guano over the lawn two or three times at intervals of ten days, well watering it in. This will kill a good many of the grubs lying near the surface.

Red spider is another terrible insect; in vineries in particular this miniature insect is induced to multiply by a dry, hot atmosphere, and lives chiefly on the underside of the leaf, which it turns a sickly yellow colour, preventing it from performing its proper functions, and ultimately interfering with the perfecting of the bunches of grapes. To an ordinary observer its presence can only be discovered by the aid of a magnifying glass. In a young state it is almost white. It spreads very quickly, and may first of all appear in the young growths in July. The best remedy is plenty of syringing when the vinery is closed in the summer evenings, and keeping the beds and flooring damp during the day according to the weather. When cleaning up the vine canes in winter a good many can be destroyed. They will be discovered in clusters under the outer bark, mostly on the underside of the joints or eyes. They hybernate in such positions until the summer comes again, and one of the reasons why vines are painted with a proper solution in winter is to get rid of such vermin. (See illustration page 186.)

Slugs and snails are very troublesome in some gardens, particularly in old-fashioned ones, where box-edgings, rockeries, ferneries, etc., have been established for many years, as it is in such places

that they find the safest home. Then there are the small slugs that breed and live entirely in cultivated ground; these usually come out in myriads on a moist evening in summer, and may be caught feeding upon all kinds of young growth. The most certain plan for their destruction is to go out with a lantern at night, and as they are so slippery it is best to cut them into pieces with a pair of sharp scissors, whilst the snails, which can be handled, should be crushed with the foot. A mixture of lime and soot dusted up the rows of beans and such vegetables as take their fancy will check their depredations, but it must be repeated after every shower of rain.

Scale is a destructive insect that adheres to the stems and ribs of the foliage of plants, mostly in the greenhouse. It somewhat resembles glue in colour, is oval in shape, and raised in the middle; it seems to remain fixed in one place, and sucks the juices out of the main arteries of the plant. Palms, oleanders, gardenias, and myrtles, are special marks for its depredations. The best remedy is washing it off with some solution. We have seen plants quite cleared of it by being stood out of doors for a few nights; but this would not suit some tender things. Other types of this pest will often be found on gooseberry bushes, particularly on dry soils. Mealy-bug is a very difficult creature to get rid of in the stove and greenhouse. How it spreads is a mystery, as it crops up in most unlikely spots. It gets its common name from the white, fluffy-like web that it seems to live in. Stephanotis, gardenias, camellias, vines, and tomatoes seem to be specially favourable to its development, and war to the utmost must be waged against it whenever discovered. We know some gardeners who hold this pest in such awe that they would rather burn a valuable plant, when found to be infested, than permit it to remain on the establishment. (See page 184.)

Earwigs are a source of much trouble in gardens in the summer, dahlias, hollyhocks, and fruit being their special favourites. They are night-feeding insects, and hide away in the daylight. The common practice of placing an inverted flower-pot on a tall stake close to the plant has little to recommend it, being an eyesore in the garden to any one with refined floral tastes. In such a situation we greatly prefer some pieces of dark-coloured paper, sugared over and crumpled up, and placed near the stem out of

sight. If opened out two or three times a week a great many earwigs and caterpillars will be accounted for.

Moles may be readily driven out of a garden by the insertion of cut portions of garlic bulb poked into their runs with a piece of stick. It is advisable to start at the most advanced run, inserting a piece about every yard across the ground to be cleared between the runs, pushed in to go down not less than 6 inches. They absolutely detest the smell of this plant, and its use is far more simple than the intricate traps generally recommended.

Where mice are troublesome in gardens they may be caught in the following manner. Get an earthenware jar that narrows at the neck, holding, say, a couple of quarts. Half fill this with water, then rub round the top and inside the neck some tasty fat, then bury the jar in the ground up to the neck. The mice in their endeavours to get at this fat will tumble into the water and be drowned. A toad is most useful in a frame or greenhouse for keeping down woodlice and beetles.

Of insecticides any number are available in the market, and under trial give more or less satisfaction, used either dry, in liquid, or in vapour. The latter is perhaps the most recent advance, and one or other of the introductions coming under this head seem very effectual in destroying insect life wherever they can be confined, as in greenhouses. For syringing plants or trees in the open a good emulsion may be made as follows: Kerosene, 2 gallons; soap, $\frac{1}{2}$ pound; water, 1 gallon. Heat the mixture of soap and water, and add it boiling hot to the paraffin; stir the mixture severely for ten minutes. This emulsion, if perfect, forms a cream, which thickens on cooling. Dilute with water up to the extent of twelve parts before using, the strength varying upon the hardness or otherwise of the tree, shrubs, or plant, to be operated upon. Sawdust or sand, soaked in paraffin and sprinkled about on cultivated ground is a useful check against many kinds of vermin.

THE END.

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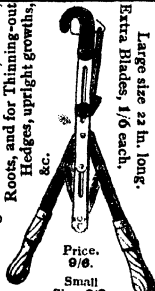


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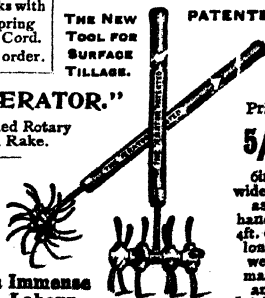
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